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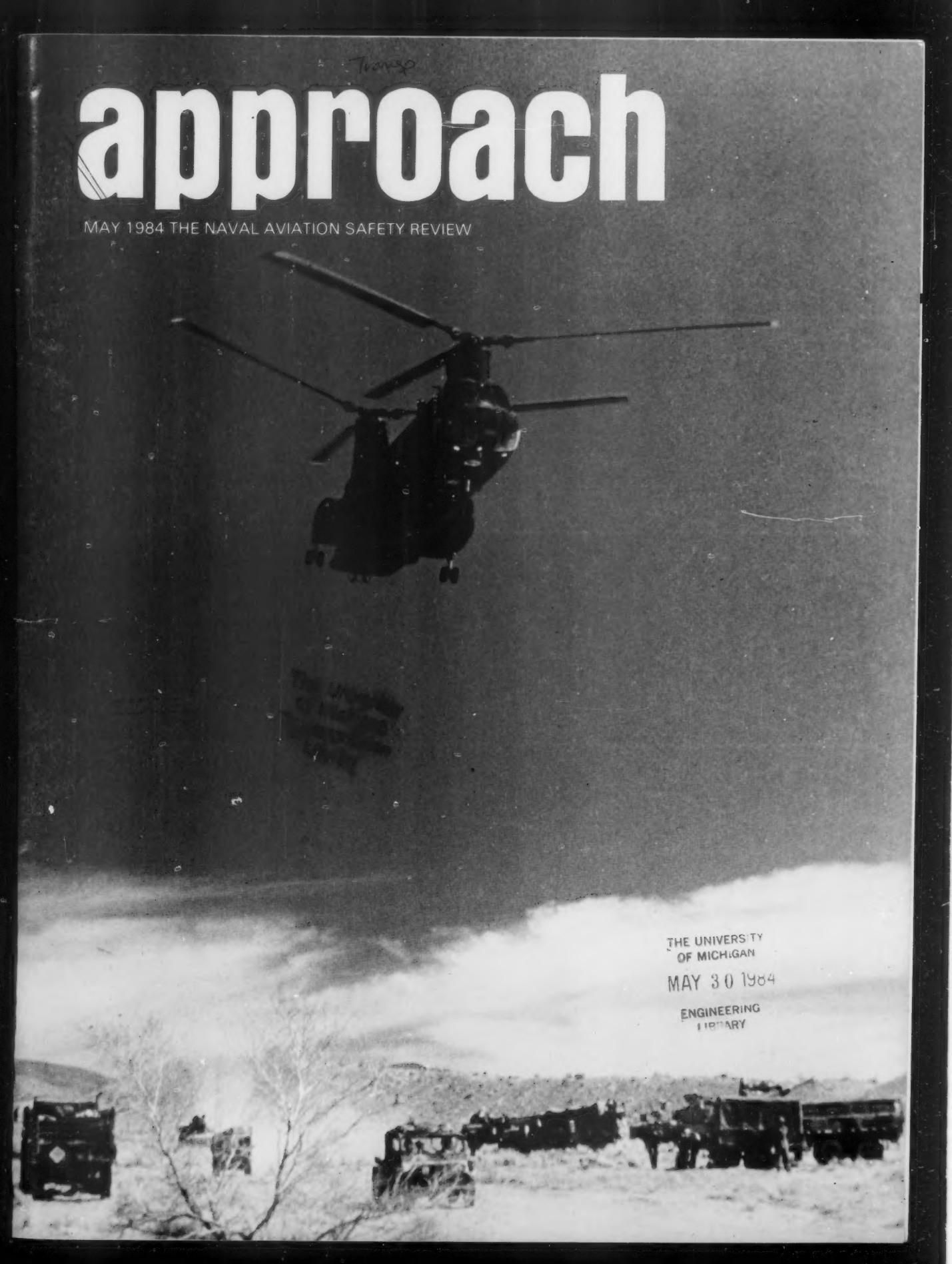
approach

MAY 1984 THE NAVAL AVIATION SAFETY REVIEW



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In this issue, Approach would like to commemorate the 72nd birthday of U.S. Marine Corps aviation which had its start in 1912 on the banks of the Severn River in Annapolis, Maryland, when Second Lieutenant A.A. Cunningham reported for aviation training on May 22, thereby starting the long line of Marine aviators which continues to the present day. Air Marines have seen a lot of action over the years, from the skies over France in World War I to the Pacific 20 years later, to Korea and Vietnam. Marine aircrews were in action during the Grenada operation in October 1983, and, fulfilling a delicate mission, were standing by in Lebanon during the Marine presence in that war-torn country.

A major part of U.S. Naval Aviation, the Marines operate in some of the most inhospitable areas in the world, wherever a U.S. military presence is dictated.

Marine Aviation has superbly supported the Marine rifleman since 1912. With the recent introduction of the CH-53E, F/A-18 and AV-8B, Marine Aviation will be even more effective in the future.

Lt. John Flynn
Editor

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inside approach

Vol. 29 No. 11

A CH-46 conducts a resupply mission at 29 Palms. (Capt. J.G. Doyle, USMC)

● FEATURES

You and Your "Envelope" 2
By Lcdr. John Wilckens, MC, USN. The stress *"envelope" can be licked, too.*

Pilot Stress and Air Mishaps 10
By Bud Baer. Stress *is an illusive factor in investigating mishaps.*

The Philosophy of Limitations 12
By Lt. Patrick Fetter. Allow ample time "from bottle to throttle."

"Marine Tailhookers . . . On . . . Off . . . On Again Program" 13
By Maj. J.C. Pastuf, USMC. Marine sounds off on sexy subject — CV flight ops.

Aviator Stress Overload 14
By Robert A. Alkov, Ph.D. Stress *is bad but stress overload is worse.*

Out of Sight, Out of Mind 16
By VAQ-131. An unlit aircraft on the runway spells trouble — especially at night.

A Ride Down the Primrose Path 18
By Lcdr. Rick Carlson. The strobes were a quick ticket back to the real world.

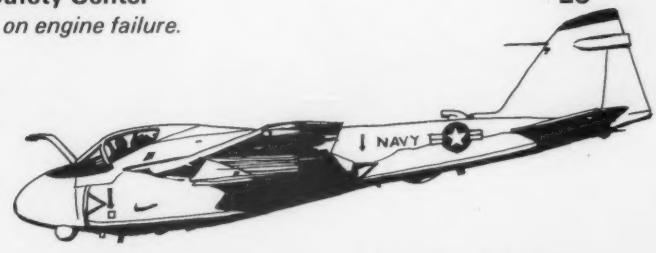
Individual Flight Activity Reporting in the Navy 20
By Lt. John Flynn. Completing your IFARS is "a waste of time" worth taking.

Dead Man's Land 26
By Lt. Franz Federschmidt. NATOPS is no substitute for good judgment.

Mishap Investigation Tips from the Safety Center 28
Some do's and don'ts are given, plus data on engine failure.

● DEPARTMENTS

1983 CNO Safety Award Winners 7
Anymouse 8
Safety Word Search 19
Bravo Zulu 24
Letters 30
1984 Approach Reader Survey 31



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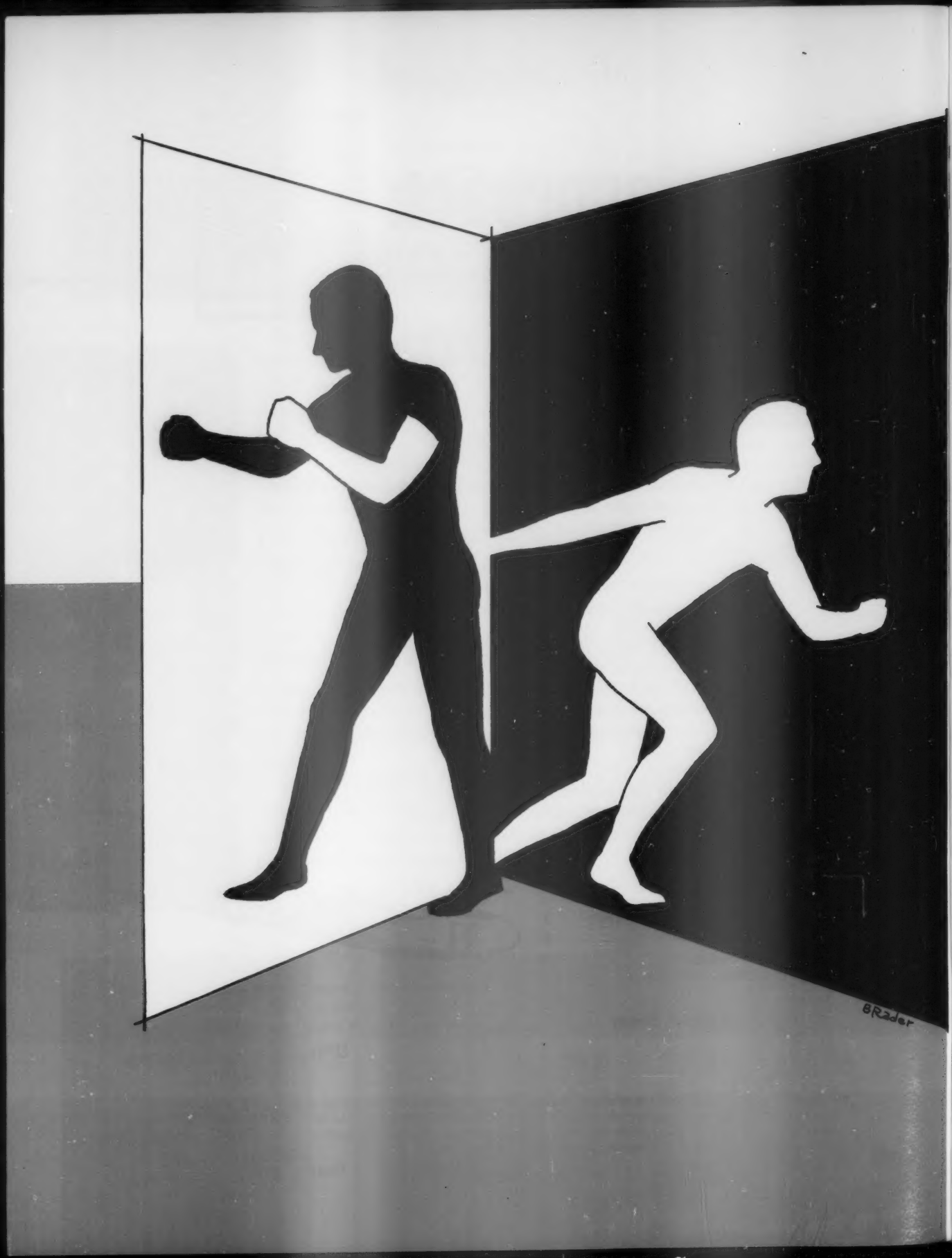
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You and Your "Envelope"

By Lcdr. John Wickens, MC, USN
VP-17

FROM the title you are probably expecting some technical article updating existing ejection parameters of your aircraft. Instead, this article will discuss *your* "envelope," the safe operating limits of *you,* the naval aviator. More specifically, I would like to discuss one determinant of that envelope — stress.

You are probably thinking this is going to be some "touchy-feely," pseudo-sophisticated garbage. Hold on! You know about stress. That's what the Navy and aviation breed. For the most part you hot-sticks are right. Few groups in the world can handle stress better than you. Our distressed world could take a lot of lessons from you.

Yes, aviators know and handle stress better than most, but you also see a lot more stress. That stress pushes you to the edge of the envelope. That's okay, too. Stress motivates life and nature in the evolution process. Stress is adaptive, the vital force that heightens our response to meet any challenge.

But modern society has evolved through technology to pose a whole new dimension of stress which we are just beginning to understand. The stress response, that rush you feel on final approach, prepares us for the "fight or flight" syndrome which allows you to bring the aircraft aboard in the worst of circumstances. That same stress response is working when the skipper calls you in on the carpet about Petty Officer Jones and his fifth rubber check. "Fight or flight" — who are you going to fight? Or, where are you going to run?

If stress continues for a period of time, it can fatigue and later damage the body to the point of disease or dysfunction. You can feel "hunkydory," flying on top of the world, and be in a state of dysfunction. To make things worse, the closer you are to that point, the less aware of it you are. It's this point, the envelope, we should concern ourselves with.

Stress is a well-described physiologic process. It directly involves the brain, the autonomic and central nervous systems and the endocrine system.

The brain is a very complex organ, but for simplicity let's consider three separate parts of it. The **brain stem,** the most primitive part of the brain, is concerned with our basic self-preservation. As we moved up the "evolutionary" ladder, we developed the **limbic system.** It refines basic instincts. As man, we developed a third part of the brain, the **cortex.** This is where we think and act. It compromises the majority of our conscious thought.

Physiologically, our body has not kept pace with our mind's development. The stress response, engineered for our brainstem concerns, is triggered also by our limbic system and cortex. So while the response was designed for action, it's often triggered when action is not required.

Okay, so we trigger the stress response — what happens then? The stressor, the threat (again, real or imagined) is received through stimulation of one of our many sensory pathways; i.e., we see a fire warning light. A lot of filtering and circuiting is done in the brain. That red light, through your training, puts you at physiological "general quarters." Your hypothalamus becomes stimulated which next triggers the pituitary gland. The pituitary gland secretes Adrenal Cortistraphic Hormone (ACTH), which circulates in the blood and stimulates our adrenal glands. Once in the adrenals, the ACTH stimulates the production of cortisol, aldosterone and epinerphrine, commonly thought of as the stress hormones.

Cortisol prepares for increased energy with its effect on metabolism. Blood sugar, the fuel for the stress response, increases. A snapshot of the body's and blood's chemistry at the height of the stress response would resemble the clinical condition, diabetes. The short term effects of cortisol provide a lot of energy to meet a particular demand. Prolonged cortisol stimulation has many effects that are not so beneficial.

Aldosterone stimulates the kidneys to hang on to sodium. This has the effect of increasing the circulating blood volume, increasing blood pressure and increasing stroke volume — the heart pumps more blood. Again, in the short term, this is a beneficial response. The long term aldosterone effect is hypertension with its attendant complications.

The circulating epinephrine, or adrenaline, potentiates the above effects. Along with the triggered sympathetic autonomic nervous system, cardiac output increases. There is increased excitability of the nervous system and increased metabolism.

All these things help put you at alert to handle some stress demand. Using the fire warning light again, the stress response speeds up your metabolism and your ability to work through the emergency. You're thinking quickly, going through checklists, with your hands swiftly enacting the steps. Your visual acuity sharpens; your reaction time quickens, and you become more sensitive to your aircraft's performance. Through training, stressful training, your

body has channeled the generalized stress response to effect a positive controlled execution of procedures to handle an emergency.

Most of you have noticed that if you stay ahead of the aircraft and execute your mission to the standards expected, you're exhausted after a flight. That's the effect of the stress response as it moves from the "alarm stage" to the stage of "adaptation." Some of you adapt well and the stress demand lessens. But physiologically, the response is going on regardless of how you feel. Even in positive control and ahead of the aircraft, you're stressed. As the body and its systems approach exhaustion, the stress response becomes maladaptive.

We've all experienced these prolonged stress symptoms but do we appreciate the toll they take on the body? Ninety percent of all hypertension has "no specific cause" and is labeled *essential* hypertension. Hypertension, regardless of the source, is a major risk factor for heart disease. More subtly, the prolonged stress response affects the body's natural immune or self-defense system. The immune system is not a target organ of the stress response *per se*. The prolonged stress response marches on at the expense of the immune system, making us more susceptible to all kinds of diseases, both infectious and noninfectious. A body not only has to be exposed, it also needs to be susceptible to become infected by some "bug."

You may all say "well and good," or "that's interesting," "But what does that do for me?" Flying is stressful, and you do a good job with it. The stress of flying you feel comfortable with, but what about all those other stresses? "What stresses?" Well, there are lots. They are subtle. They are *insidious*. They are *accumulative*. And physiologically, they are *dangerous*.

So what are these other stresses? There are psychosocial stresses, bioecological stresses, and the stresses of our own behavior and personality. *Keep in mind they trigger all those hormones and systems the same as the fire warning light.* Let's look at some of the psychosocial stresses:

Two big ones are PCS orders and deployments. These changes are stressful, triggering the stress response, even if those orders are your first choice or the deployment is a "liberty run." Remember, any change is stressful.

Then, there is frustration. How many times are you tasked with more than is reasonable? Sometimes it seems like the whole U.S. Navy is meeting commitments that exceed its capability. That's not without a price. Frustration triggers the stress response and can overload you.

Personality and behavior patterns are stress-related. That aggressive, dominating personality you are so proud of can go a little too far, emerging as hostility. Rigid and unbending profiles will trigger the stress response when you find yourself between the proverbial "rock and a hard place." Another typical stress provoking personality trait you may exhibit is your obsessive-compulsiveness and your attention to detail. For the most part, that perfectionism keeps you alive and allows you to overachieve. Just realize that physiologically it can be triggering the stress response. To a point it's adaptive, but past that point it's maladaptive.

Some of the last stresses I want to discuss are *bioecological*. Some may seem obvious, but few are really appreciated. How about noise? Those 120 dB on the flight deck or 85 dB in your office at the hangar trigger a stress response. In your office, you close the window to close out noise only to experience another, heat. Dehydration and fatigue are all stresses in their own right. If your environment is not comfortable, it is stressful.

Another factor we ignore, usually because we don't understand it, is biological rhythms. We are aware of *circadian* rhythms, our 24-hour biological clock. Aviators have to cross time zones and fly at night. You can't change that, but keep a mental note you're triggering a physiologic response.

While aviators do well with stress, nutritionists and physiologists would wonder how, because of your "stress prone diet." Starved and hypoglycemic, you show up for your brief with a "fighter pilot's breakfast," coffee and a candybar. It provides instant energy until your pancreas squeezes out healthy amounts of insulin. That insulin pushes most of that sugar into your starving cells causing *rebound hypoglycemia*. Hypoglycemia produces a stress response. The coffee can also be a problem. Caffeine is a stimulant, acts as a sympathomimetic. It kind of triggers a stress response without even a stressor. One, two, maybe three cups a morning are fine (six-ounce cups); any more is unhealthy and counterproductive.

If breakfast is bad, lunch and/or dinner are probably worse. All that processed food has little nutritional content, is high in salt and has tons of fat. Only when you drag that burger through the garden do you get any compensation. What you eat and drink is important.

If that's not enough, some of you tend to add insult to injury with a smoke or a chew, or whatever. Tobacco nicotine also ignites a stress response.

The phychosocial, bioecological and personality stress can be very insidious. The stress response is generally the same, regardless of the trigger. The stress response was designed for action, not for writing evals, passing an NTPI or driving to work. It was designed for night hovers over an overboard sailor in sea state 5, fire warning lights and combat. Cortisol, epinephrine and aldosterone don't help family fights, command selection boards or flat tires.

Many of you are probably thinking you've got it all "compartmentalized." "That's how I can live in this stressed and insane world and still fly." Compartmentalization is protective and certainly explains how you can leave the XO, wife, car and kids on the deck while you fly. I feel it's a rather new evolutionary tool. To a point it short circuits cerebral thoughts and stressors, shelving them for a more opportune time. But it's short term, too. Like stress, it can be adaptive if used as designed and maladaptive if used in a prolonged sense. Your brain has only so many shelves, and it can get overloaded. Also, you can't compartmentalize something

forever. That stuff has to surface some time and needs to be dealt with. Pushing problems continually under conscious thought becomes stressful in itself.

So what now? Well, half the battle is won. Knowing you're close to the edge of the envelope and how you got there is important. You may not be able to change that. You may not want to change that. But you also want to know when you're over, what got you there, and how to get back in the envelope.

As aviators, you understand systems. You are sensitive to system malfunctions. Popped circuit breakers, vibrations or annunciator panel lights trigger a dissection of the system involved trying to figure out the particular malfunction. You appreciate indications of impending engine failure long before the engine actually fails. In fact, you shut the engine down before it fails. You need that same sensitivity about your own biological systems. Appreciate the ping or vibration in your own body. Don't ignore headaches, low back pain or eye strain. Don't discount high blood pressure readings, allergy flare-ups or recurrent illnesses. Your GI system bears particular attention. Your body deserves the same careful appreciation as your aircraft.

If we insist on pushing our bodies like machines, we need to treat them with similar care. Schedule maintenance, do preventive work or perform corrosion control. After so many hours the aircraft and engines are inspected, put into phase, go to NARF, etc. Take leave. You shouldn't be flying if you haven't taken leave in over a year. If you work hard, play hard. But that play should not reinforce the stress response, it should release it. On occasion you need something mindless and non-ego-serving. You should come off the golf course more relaxed than when you went on it; if not, you need a new sport.

Identify the stressors. You can't always change them, but there may be alternatives. Much of our stress is mental or psychological. Is it necessary? Are things prioritized in your life? The big picture helps. Goals help. A spiritual experience may help. Look at your day. Could it use a little more structure and management? Does everything have to be done by crisis management? If you're spending long hours at work, there's a good chance things aren't organized, running efficiently, or you're doing somebody else's work. Delegate responsibility. Learn to say no. Don't over-commit yourself. Take your horrendous workload and divide it into several manageable parts. Set goals, plot progress, document work. Try avoiding all other unnecessary stresses. Accept help, accept fallibility. Plan ahead, anticipate and realize vulnerabilities. A big misconception is that boredom is relaxation, but it is not. It happens to be very stressful. Vacation and leave doesn't always mean relaxation either, with taxis, airports, lost travelers checks, etc. And your diet. Do your diet justice. Make every effort to modify it to some healthy standard. You put "high-test" in your aircraft and your sportscar. Why not put some good "fuel" into your own body's engine?

Another myth is that alcohol relieves stress. When you come home each night, before you kiss the wife or kick the dog, how many of you grab for a beer from the fridge? Somehow that first beer puts things into perspective. If one does it for you — great. But if it takes many more, you've got a problem! Alcohol is a chemical depressant. In small amounts it acts like a stimulant because it depresses the restraining neurotransmissions. In larger amounts it depresses the brain in general, including those stress response activators.

Alcohol doesn't make problems go away. If you thought you had brushfires before, DWI or an alcohol-related incident will certainly complicate your life more. Physiologically, alcohol inhibits other systems, the immune system in particular, which is already under attack from your stress. Your gastrointestinal system, to include the liver, is tested. Long after your blood alcohol level returns to zero from an overindulgence, your brain suffers from lost neurons and neurotransmitters. In the final analysis, if not a stress itself, alcohol interferes with your body's abilities to handle stress. It's certainly not a remedy.

What is a good prescription for stress? One of the best is exercise, aerobic exercise in particular. Yes, exercise is a stress, but it's used as designed, mobilization for action with action. A good aerobic routine makes the body systems more efficient. Excess fat and sugar are burned as fuel. The body changes its metabolism and attempts to realign itself with natural cues. Sleep becomes better, if not more. Diet becomes healthy. Excess stress metabolites are burned off, allowing the body as a whole to rest and recuperate after exercise. You gradually obtain the physical and mental ability to do more work in less time.

But exercise is not a panacea. Again, it's also a stress, and to extremes it can precipitate a failure in the body. As your percent body fat drops way off, your immune system suffers. World class athletes are intimately aware of this. They train to peak for the big event. If they peak too early, they experience illness or injury at game time. After the big event, athletes reduce or stop training for a period of time to recover. This is sort of a "safety standdown" for the body. As aviators, you don't peak as a rule. On deployment or with a max flap, you may extend yourself more. But day-in day-out, you operate just below peak performance. You call on the reserves when that emergency happens. Excercise then should enlarge your envelope, not bring you closer to the edge of it. Exercise should not stimulate psychological stress either. It's natural for aviators to be competitive when they put on a jock strap. But if you're breaking tennis rackets after you lose, you're missing the point. Personal records and goals are great, they encourage better performance and

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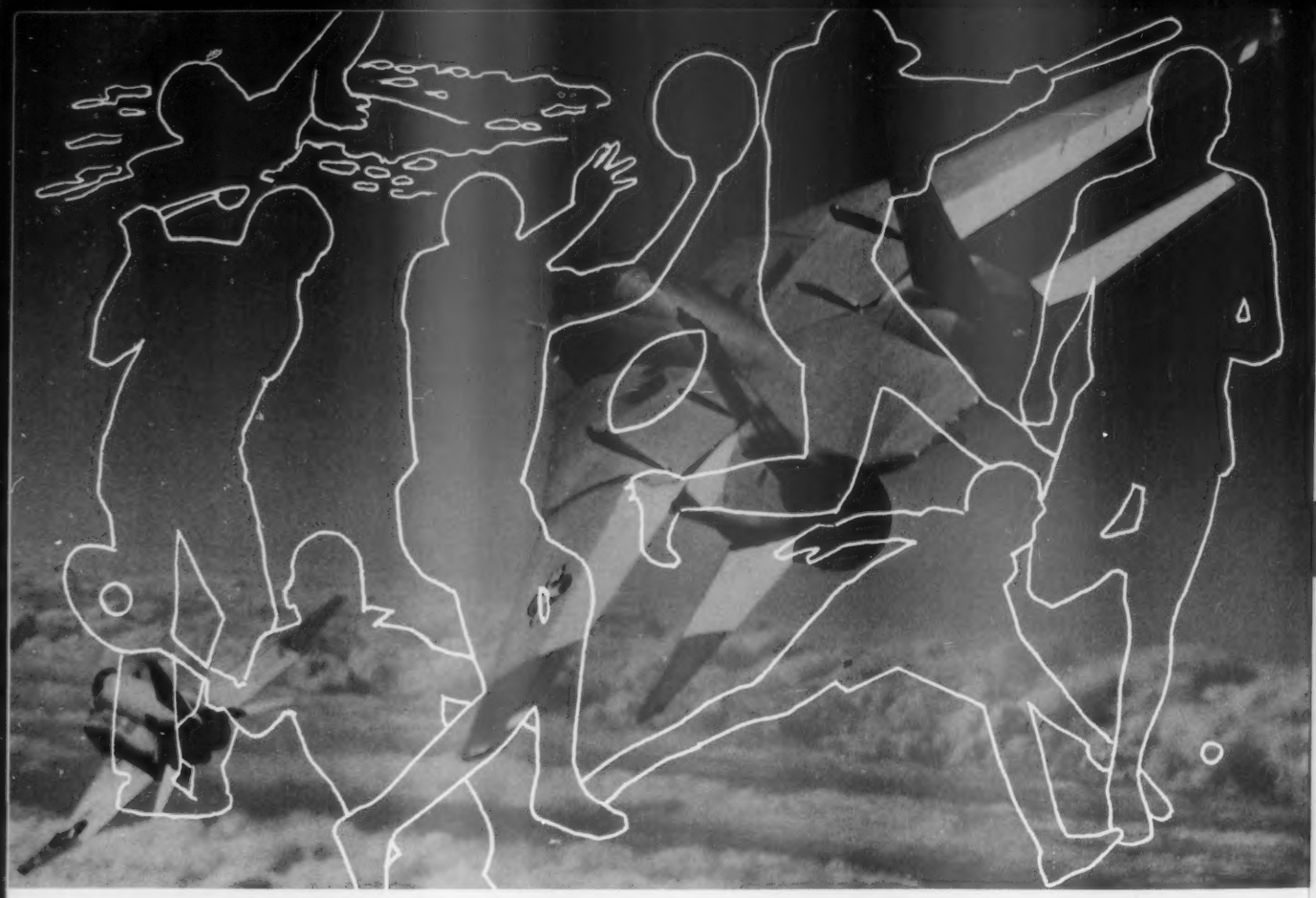

make exercise more fun. They are not essential though. Don't be obsessed with them.

For you, the best way to get that aerobic exercise is to run. For a unit of time, it's the easiest and quickest way to get in shape. The gouge formula for exercise is: subtract your age from 220, multiply that by 0.75. That's your target heart rate for exercise. Do that 30 to 40 minutes at least every other day. More is better but be careful and listen to your body. Alternate hard and easy workouts. Alternate exercises if possible. If you begin to feel rundown, skip a day or two.

Why should you listen to all this stress stuff? Two good reasons are money and fitness reports. First, fitness reports. Again, what has your Navy training been geared to? Stress? Actually it's stress management or recognizing and handling stress. As your career progresses, so does the stress. The higher you go, the keener the competition, almost so as to keep pace with the accompanying stress. If you aspire to a Navy career, command or flag, be fair to your abilities and intelligence. Learn your envelope. Operate it to your benefit.

Understanding and managing your stress profile also means dollars. The obvious dollar sign is the broken airplane. You notice also it's the talented or good pilot or crew who crash. There are a lot of reasons for this. One is that the good aviator is stressed a little more than the average stick. His talent got him a great, but demanding, ground job, an instructor qualification and all the headaches that no one else can handle. In perspective, that means success, a top one percent FITREP. Out of control that can spell disaster.

Besides the cost of your airplane, there's the cost of you and your crew. A seasoned aviator is worth more than his airplane. And the higher up you go, the bigger the hole you leave when you go. Also, the higher you go, the more subtle your demise from stress. Besides breaking airplanes, you finally begin to realize the end organ damage of the chronic stress response. Heart attacks, strokes, diabetes and alcoholism. The Navy is just beginning to realize its investment in you and is beginning to protect that investment. Large corporations are putting their executives through stress seminars. They are forcing physical fitness as an adjunct. They've noticed not only fewer six-digit executive holes to fill but that productivity has increased. As a two-ocean Navy covering three oceans, we should follow suit.

As aviators and as officers, stress is real and it's physiologic. You can't ignore it. Understanding it and then managing it is the key. You, the person, have a safe operating envelope. It's not as well described, but it is just as finite as your aircraft's. You don't fly your aircraft intentionally outside of its envelope. It logically follows you should stay within yours. The 17th century philosopher Blaise Pascal wasn't an aviator, but he says something profound to each of us: "The greatness of the human soul is shown by knowing how to keep within proper bounds."

1983 CNO Safety Award Winners

CNO "Readiness Through Safety" Award

COMMANDER NAVAL AIR FORCE PACIFIC FLEET*
CHIEF NAVAL AIR TRAINING

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VA-75
VP-30
VS-30
VAW-123
HS-5
VQ-4
VA-45
HSL-34
HM-16

COMNAVAIRPAC
VF-211
VA-97
VA-52
VAQ-132
VS-29
VAW-117
VP-22
HS-8
HSL-31
VA-128
VRC-30
VQ-1
HC-11

CGFMFPAC
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* SECOND CONSECUTIVE YEAR
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Admiral James H. Flatley Awards

CV/CVN — USS *John F. Kennedy* (CV 67)
LPH/LHA — USS *Tarawa* (LHA 1)
LAMPS — USS *Authur W. Radford* (DD 968)

"Do as I say . . ."

The admiral "working up" the ship and air wing team decided to do a little impromptu inspection/visit to the flight deck about five minutes before a major 20-25 plane launch. Picture if you will, a flight deck full of turning, screaming, blowing, sucking aircraft and at least 300 "impressionable" junior personnel. Along strolls the admiral, dressed in short-sleeve double-knit khaki with all the accouterments, low-cut non-safety shoes, no flight deck safety vest, no ear protection and wearing his best baseball cap.

One young, but experienced and well-thought-of flight deck safety petty officer approached the admiral and very diplomatically explained the situation, figuring he simply had other things on his mind. The admiral, rather than thanking the young man, very curtly let him know in no uncertain terms that he was the admiral in charge, and he would do what he wants, where and when.

This same admiral was later seen sloshing through a toxic fluid spill in his low-cut shoes. Purpose? To dress down a young sailor cleaning up the spill because the sailor was not wearing a proper uniform. What's the point of this? Simply, how many times have we at all levels of command by example unconsciously said, "Do as I say, not as I do"?

Juniormouse

The Case of the Missing Tool

After four of our aircraft flew and came back one day, the maintenance chief and I were told by our tool room airman that we were missing a tool. It had been missing since some time the previous afternoon. We conducted a search of all squadron work centers, tool boxes and aircraft to no avail. We found the tool had not been checked out of the tool room at all, that it had been stolen. What gets me is this. The petty officer who runs the tool room on days *knew* that the tool was missing, reported it and was told *not* to issue a missing tool report. If it was not found, he would simply replace it. The airman who runs the tool room on nights found out about it a day and a half after it was gone!

I am the safety petty officer of my division, and when things like this happen, I just want to find the guy who did it and nail him to the wall. We had four aircraft flying the day it was lost and four aircraft flying the next day when we found out about it. If that tool had FODded out an engine or a control system, it could have killed everyone on board the aircraft. How do you tell the family of the dead pilot

ANYMOUSE

or aircrewman that their loved one was killed by a misplaced tool? Maybe we should make the guilty person tell them.

If we have such a foolproof system, why do things like this happen? I think part of it is because people are not paying attention to their jobs. When the liberty bell rings, all they are thinking about is walking out of the hangar as fast as they can.

Concernedmouse

Smoking Hazard

Recently, an officer was observed smoking a cigarette immediately adjacent (within 10 feet) of an aircraft. The smoking of a cigarette within 50 feet of any parked aircraft is expressly forbidden at this installation. OPNAVINST 3710.7K prohibits smoking during all ground operations.

This blatant violation of directives can be further illustrated. On two separate occasions while operating a Navy aircraft, this officer's discarded cigarette butts have caused two ground fires. One of these ground fires became so serious that our field was secured until crash crews could successfully combat the fire.

Whether these incidents are related to this pilot's carelessness or ignorance is immaterial. The dangerous result of unauthorized cigarette smoking should be made evident to all individuals.

Firedupmouse

Stick to Your Guns

While demonstrating aircraft preflight techniques to newly arrived personnel at NAS Southeast, the squadron NATOPS officer explained the indications for an oil C-Sump failure on the starboard TF-34 engine of an S-3A aircraft.

One of the "trainees" then examined the port engine and pointed out one of the "signs" on that engine. The NATOPS officer confirmed the findings and, upon completion of the training, wrote a MAF (Maintenance Action Form) downing the aircraft pending further inspection by a power plants technician.

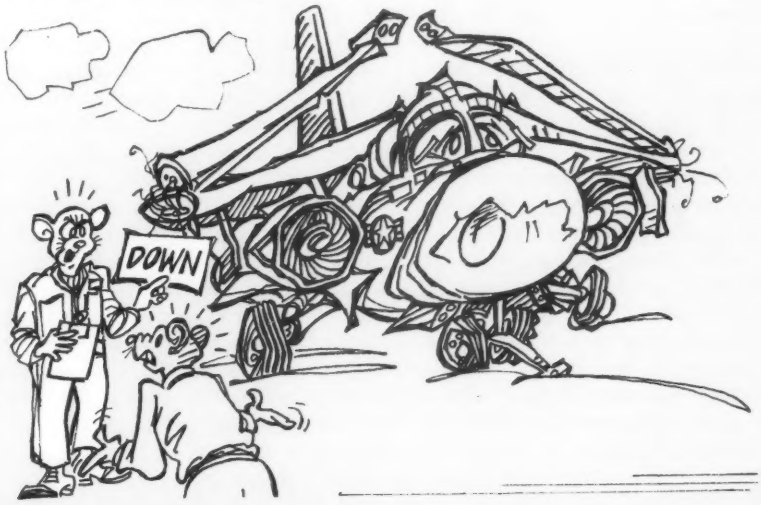
Fifteen minutes later, the NATOPS officer received a call from Maintenance Control telling him the troubleshooters had looked at the engine, didn't think it warranted a downing gripe and that they would, as a favor, quietly "tear up" the gripe so as not to embarrass him. The NATOPS officer replied, "Negative, sign it off and enter it in the Aircraft Discrepancy Book!"

The outstanding downing gripe now prompted Maintenance to conduct an engine inspection and low-power turn. During the low-power turn, upon reaching 80 percent engine rpm, a loud bang was heard and a plume of flame was observed exiting the exhaust pipe. The engine was immediately secured and, after cooling, was borescoped. With no apparent internal damage indicated, a faulty fuel control was suspected and replaced. On the subsequent engine turnup, however, similar bangs and flames were observed. The faulty engine was then changed and returned to supply for repair.

This sequence of events could have had a much different ending. If the NATOPS officer had yielded to the pressure and torn up the gripe, the engine would probably have failed on the next flight, possibly during a critical phase, with catastrophic results.

The lesson learned from this incident is: if you're convinced the possibility of a problem exists, stick to your guns and insist proper maintenance procedures be carried out. You owe it to yourself as well as the next crew who "strap on the aircraft." ATTA BOY! NATOPS.

Safetymouse



Pilot STRESS and Air Mishaps

By Bud Baer
Approach Writer

THE F-14 pilot had eight hours of uninterrupted sleep before the mission. Two hours earlier he had eaten a regular dinner of steak and potatoes. He exercised often, was considered in excellent physical health and was not on medication.

Preflight, manup and launch were normal. The night air intercept mission complete, the approach to the carrier seemed routine — until approach control requested an inbound report that wasn't acknowledged. Radar contact was lost.

Debris was sighted at dawn 40 miles from the carrier. The crew was not found nor was there evidence of an ejection attempt.

A few days later, a close friend of the pilot revealed that the pilot had expressed concern about a number of his personal problems. Among them were:

- A divorce that became final during the past month.
- Death of his father three months ago.
- Purchase of a home with a rather large mortgage and a $12,000 boat which made him feel "somewhat overextended financially."

Could these psychological stresses have impaired his piloting performance? Did they affect his judgment in flight? Was this the cause of the mishap?

A statistical study of his recent life experiences was conducted, based on the Holmes-Rahe Life Changes Questionnaire. It was developed a decade ago by Dr. Thomas H. Holmes, a University of Washington professor, and Capt. Richard Rahe, MC, USN, currently in charge of naval medical facilities on Guam.

The questionnaire lists 43 changes — some good, some bad — that might occur in any person's life and ranks each of them numerically. The important feature in assigning numbers to these life events is *change* affecting an ongoing lifestyle — changes that require adaptive or coping behavior. Many are ordinary events of life and include family matters, economic situations, vacations and retirement. Those assigned higher numerical values could be more traumatic.

Actually, this questionnaire is designed to "predict" future illness susceptibility rather than accident proneness. This is because the degree of stress caused by these events and the ability to handle the stress varies from individual to individual. This variation makes it virtually impossible to quantify stress and to measure its effects in a statistically valid manner. Yet, it is still employed in mishap investigations, as it was in the F-14 loss.

In a study by Holmes and Rahe, it was found that of those persons who reported life change units that totaled between 150 and 199 points, 37 percent had associated health changes within a two-year period of such life crises. Of those scoring between 200 and 299 units, 51 percent reported health changes and of those over 300, 79 percent had illnesses to report on an average of one year after the life crises.

The F-14 pilot's life changes were listed as follows:

Life Event	Points
(Those particular to the pilot)	
1. Divorce	73
2. Death of close family member	63
3. Change in financial state	38
4. Recent mortgage over $10,000	31
	205
(Those associated with deployment)	
1. Change in work responsibilities	29
2. Change in living conditions	25
3. Revision of personal habits	24
4. Change in work hours/conditions	20
5. Change of residence	20
6. Change in recreational activities	19
7. Change in social activities	18
8. Change in sleeping habits	16
9. Change in eating habits	15
	186
Grand Total	391

The pilot of the downed Tomcat showed a total of 391. Statistically, this placed him way up on the Holmes-Rahe scale as "high risk." So can we attribute this mishap to pilot stress? No way!

Note that 186 of his points were a direct result of his deployment. These he got just by going to sea as did every other carrier pilot in his squadron. His remaining 205 points, although still high on the scale, now do not appear to be as alarming as the total.

Naval aviators seem to have an inherently increased tolerance to stress. Change is part of their lifestyle. They periodically go on long deployments. During shore duty, they and their families undergo frequent moves. Also, most pilots are "jocks." They maintain good physical condition through regular exercise. This helps them cope with stress, too.

The cause of this F-14 mishap was never determined. As for the pilot stress factor, it was impossible to pinpoint to what degree, if any, the pilot's personal problems played in the mishap.

"There have been several recent mishaps where stress has been considered to have been a major factor in the chain of events," according to Capt. G.A. Vasquez, MC, Head, Aeromedical Division, Naval Safety Center, Norfolk, Va. "Mishap investigations should consider stress. However, the presence of stress should not become the new 'pat' answer in mishap investigation that 'pilot error' used to occupy several years ago. Naval aviation is a high-stress environment. Standard criteria used to measure stress confirm that most naval aviators are in the very high risk category on every deployment, detachment or return from the same. It is the inability to cope with stress that may be the problem, *not* the simple presence of stress. The goal of any investigation that focuses on stress should be to determine what signs or symptoms were present early enough to allow detection and possible intervention." ◄

The Philosophy of Limitations

By Lt. Patrick Fetter
HSL-34

LET'S start with a simple, multiple-choice question. Who said, "A man's gotta know his limitations"?

A. Dolly Parton

B. Harpo Marx

C. Harry Callahan

Of course, the correct answer is "C." You don't have to strut around clinching your jaw and shooting up movie sets to prove the point; it's as applicable to real life as it is for Dirty Harry. More so, even in light of that intriguing collection of levers, gauges and switches you carry in front of you in your role of naval flier.

So, what are these limitations? And how does one go about knowing them? Indeed, there is no simple concept of limitations, for they are many and varied, and one almost always implies another. How many beers does it take to:

1. insist that your wife drive you home?
2. insist that you can drive just fine, thanksh?
3. insist that you're quite comfortable in the ditch, occifer?

To those of us who drink, the above three situations certainly correspond to different amounts of alcohol and are essentially a personal concept of your limitations. It's something you have to decide for yourself.

Now, here's an easier question. How many beers does it take to keep you out of the cockpit? Every nugget knows 12 hours from "bottle to throttle." A hard and fast rule if ever there was one. Nothing personal there; that decision's made for you already. Right? So, when you've been sucking down ouzo until 4 a.m. trying to make the local "buffarillos" look better, you'll still be ready for the 1700 tanker run in your mighty KA-6D. Right? Once again, a personal decision.

And since there's more to life than cold beer, a realization of other factors affecting physical performance is mandatory. Missing limbs and profuse bleeding are obvious enough, but let's not ignore emotions, medications and that nagging sinus problem.

Now let's talk about something else dear to your heart — your flying machine. The thing is so chock full of hydraulic fluid, fuel, oil, bullets and electrons, it practically screams for attention. You dutifully study your NATOPS in the RAG to learn all you can about which way the little needles should point and why the lights flash when something is not right. Practicing emergency procedures becomes a way of life. When you arrive at your fleet squadron, you're so good that you can quit reading your NATOPS, sit back and tell "there I was" stories. After all, the instruments are clearly marked, all the important stuff is in the pocket checklist anyway, there's hot popcorn and a movie in the wardroom, and *you are a fleet aviator*!

But, when did you last take a close look at those instrument markings? Chances are, some may be a few percent off (or totally wrong). To a main drive shaft spinning at 6360 rpm, three psi of missing oil pressure could make quite a difference.

And how about that torpedo? There's a reason for its launch envelope. How would you like to tell your grandson some day that the big one got away because you were too fast or too high when you released?

So it seems these wings of gold carry a responsibility that extends up and down the chain of command. Many folks take a keen interest in the way you fly that multimillion dollar airplane: copilot, maintenance chief, CNO, wife, the enemy, to name but a few. So, like the gunslinger who must be constantly aware if he's fired five bullets or six, a man's gotta know his limitations. ◄

"Marine Tailhookers . . .On . . . Off . . . On Again Program"

By Maj. J.C. Pastuf, USMC
Marine Rep LSO School

PERIODICALLY, Marine tailhookers have been called upon for duty involving fleet carrier qualifications, refresher training and subsequent extended deployment. Looking toward the near future, present indicators have Marine squadrons playing a much greater role in this CV arena. Whether a linch pin in the supervisory chain or a readyroom bandit, will you be ready for the vigorous challenge ahead? The following suggestions warrant attention and should assist in your assessment of the preparations for carrier operations:

Realize . . .*Limitations*
Review . . .*Lessons Learned*
Train . . .*Safety and Professionalism*

Limitations. The universally accepted cliche "know your limitations" is particularly applicable to carrier operations. As a Marine pilot, flight officer, ground officer, maintenance technician, etc., the following premise should be adopted for starters: That my (your) squadron will be conducting operations in a relatively unfamiliar environment. Each squadron member will require, in addition to flight operations training, a thorough indoctrination in the array of day-to-day tasks and events aboard an aircraft carrier. Marine and Navy counterparts should realize that this peculiar situation will further compound the already extensive and demanding training evolution which must be undertaken. Making assumptions at this critical stage of initial training could prove to be a costly decision measured in personnel and equipment losses.

Lessons Learned. Since 1970, nine Marine squadrons have served with carrier air wings during 11 cruises. This statistic does not reflect the numerous VMFP/VMAQ detachments deployed during this time frame. Exposure to the carrier environment was distributed evenly over the past 14 years as designated squadrons and detachments augmented the force during peak combat periods on Yankee station, replaced USN squadrons undergoing aircraft transition (i.e., F-4 to F-14) or were simply "hole fillers" whenever a paucity of embarked assets existed. The documented lessons learned from these past cruises must be considered a most valuable resource. Post deployment/end of cruise reports are readily available for review and provide, as a minimum, relevant information and lessons learned in the following areas: commanders' perspective, personnel and general administration, operations, logistics, aircraft maintenance and supply. Capitalizing on this opportunity to learn from one's predecessors should significantly assist the squadron in its quest to develop a comprehensive pre-deployment operations order and training plan.

Safety and Professionalism. Whether USN or USMC, safety and professionalism should be the hallmark of any training evolution, particularly in the potentially hazardous environment of CV operations. A thorough knowledge of the rules provides an excellent starting point. One would expect a prospective Super Bowl champion to be familiar with the team's play book. Well, unfamiliarity with or reckless deviation from the established rules by a "player" in the CV environment could result in much greater loss than a Super Bowl defeat. Therefore, the following references should be considered the cornerstone to any squadron's carrier landing safety program:

LSO NATOPS
CV NATOPS
Type commander instructions
Ship instructions
Airwing tac notes

Among the many factors which must be considered prior to initial CV operations, the most obvious is "quality of leadership" on the deck as well as in the air. In addition to this established fact that effective leadership is absolutely required throughout the chain of command, the LSO and safety officer have significant roles and experience a dramatic growth in responsibility. The Marine Training Qualified LSO assigned to the squadron, for instance, is likely to be the most knowledgeable individual in regard to CV operations and, therefore, becomes responsible for establishing and directing training programs for aircrew and other personnel. The squadron safety officer, as well, must expand the existing safety program to encompass previously unfamiliar territory such as safety on the flight deck and throughout ship's spaces. The LSO and safety officer, however, are but only two individuals. What's required to maximize this concept of safety and professionalism is an all hands effort for which there can never be a substitute. ◄

Aviator Stress Overload

By Robert A. Alkov, Ph.D.
Naval Safety Center

NEW insight into pilot stress overload and its relation to aircraft mishaps has been gained from recent research by the Naval Safety Center's Aeromedical Division.

Previously, we correlated the number of life change units that an aviator had accumulated over an 18-month period with involvement in an aircraft mishap, but without much success. What we didn't take into account were the individual differences in stress coping. When it was discovered that some people react entirely different to, say a divorce, depending on their personality and life situation, we made up a questionnaire covering personality factors along with some stressful life events. Some of these factors were actually symptoms of **stress overload** although they weren't identified as such. The life change units weren't used in this study.

The questionnaire was sent to flight surgeon members of aircraft mishap boards to be filled out on any aviator involved in a Class A flight or flight-related mishap during calendar years 1979-82 who might have been in a position to influence the outcome of the mishap, regardless of the cause. These involved aviators were pilots, copilots, student pilots, naval flight officers, etc. The questions were not shown to the aviator but were filled in by the flight surgeon who got the information from peers, superiors, family members, etc. during an interview.

We eventually got 737 useable questionnaires back. (Some that weren't useable were filled in on people involved in cause-undetermined mishaps.) These were divided into two groups, those who were subsequently found to have played a contributing role and those who had no contributory role to play in their mishaps. These were almost evenly divided; there were 381 in the group of aviators who had a contributory role and 356 who did not.

When a statistical analysis was made to determine if any of the questions would have discriminated those who contributed to their mishaps from those who did not, we got some interesting results. The aviator who played a contributory role in his mishap was much more likely to show the personality characteristics of a poor leader, to be less mature and stable, to lack an adequate sense of his own limitations, to be less professional in his flying and to lack the ability to assess potentially troublesome situations. In addition, he was more likely to have recently undergone a change in personality and to be having trouble with interpersonal relationships, to have trouble getting along with his peers and superiors and to have recently started drinking to excess or changed his alcohol intake. He was also more likely to have recently undergone the life changes of a recent engagement to be married, to be experiencing financial problems and to be making a major career decision.

Looking at these personality characteristics, we realized that they were consistent with an individual with little or no introspection. The typical aggressive military aviator is an individual who denies his internal emotional life and perceives his internal emotions as external to himself. When confronted with stressors such as failure to achieve a life

goal, he turns his frustration outward and, while denying his own angry feelings, projects them on to others. This blaming others for his problems is called "acting out" behavior. This type of behavior leads him into difficulty in dealing with other people. Such an individual lacks insight or self-knowledge. He sees his emotions as weakness and consequently possesses few coping strategies for dealing with them. The coping strategies which he develops for dealing with his stresses, while seemingly successful in his in-flight performance, often lead him into difficulties out of the cockpit. Coping techniques for overcoming fear-of-flying such as "macho" aggressive behavior, alcohol and other substance abuse and risk-taking leave him vulnerable to the effects of self-imposed stress. This ultimately leads to accidents.

The aircraft mishap due to aviator error might be seen as a symptom of inadequate stress coping behavior. Our data leads us to conclude that when a non-introspective aviator is faced with stressors such as financial problems, marital engagements and career decisions without having developed adequate stress coping techniques, he is more susceptible to the human error aircraft mishap.

A substantial portion of stress overload may be avoided by estabishing a personal program of **life stress management**.

There are several techniques which can be applied to help prevent the accumulation of life stresses. Some are as follows:

- Establish a program of **physical fitness**. Exercise provides the body with an outlet for the energy provided the muscles for "fight or flee," reducing stress effects such as high blood pressure, accelerated pulse and excess cholesterol. It also has the added result of reducing weight, itself a stressor.
- Learn to recognize and avoid the heavy pressures imposed by getting behind schedule and not meeting deadlines. In allotting your time, think about your life goals — what you plan for yourself and your family — and order them by priority. Separate your tasks into three categories of action: things that must be done, those that can be delayed and those that you can forget about.
- Take a realistic assessment of yourself. What are your capabilities and limitations? Strengths and weaknesses? Set your goals accordingly. Learn to recognize your limitations and work competently within them without selling yourself short. Establish realistic life goals.
- Whenever possible, avoid stressful situations and encounters. If crowds add to your frustration, avoid them when possible. If you have relatives or acquaintances with whom you don't get along, stay away from them as much as possible. Don't volunteer to take on stressful jobs when you are already overburdened.
- Be aware of other, more specialized techniques that can help you cope with stress. Most are designed to evoke what psychologists call the **relaxation response** — a condition of your body that is opposite to "fight or flee." These techniques have been used successfully by athletes, businessmen and others in high tension professions to maximize performance and minimize the effects of stress. The relaxation response brings a profound rest, much deeper than sleep. Oxygen consumption and heart rate drop markedly, and blood lactates — products of fatigue — are no longer produced and are cleansed from the body, giving it time to restore normal function which, in turn, improves your ability to cope with ensuing stress. ◄

Editor's note: Dr. Alkov is an aviation psychologist for the Naval Safety Center. A former naval aviator, he is also an experienced civilian pilot. He has been a frequent Approach contributor.

Out of Sight, Out of Mind

Sent in by VAQ-131

DURING an intensive airwing weapons detachment to NAS High Desert, two EA-6Bs were scheduled for a night MAS (maritime air superiority) flight with a flight of two F-14s in a local military operations area (MOA). Launching at dusk into somewhat deteriorating weather conditions, the EA-6Bs proceeded to the MOA and completed numerous uneventful night intercepts before departing and returning to High Desert as a flight of two. Field weather was reported as VFR with snow showers in the vicinity. The flight was given a radar-monitored descent below a high overcast layer by the airborne E-2 and proceeded VFR to the six-mile initial. Approaching the initial, visibility reduced to three miles and runway lighting was not visible.

En route, the EA-6B crews heard an F-14 and an S-3 reporting the initial inbound to the field. When the runway lighting was finally acquired by the lead EA-6B pilot at approximately three miles, he realized that his flight was offset to the right and commenced a gradual correction to align himself with the runway for the break. Approaching the numbers, it became apparent that the weather causing the low visibility was directly over and to the east (right side) of the duty runway; weather to the west of the runway was clear and aircraft lights in the downwind pattern were easily observable.

At the numbers, the EA-6Bs were cleared to break and their interval was reported as an S-3 abeam. The lead EA-6B crew immediately sighted the lights of what they thought was their interval at precisely the abeam position. Still in a slight turn to align the flight with the runway, the lead pilot took a slightly longer-than-normal interval on that traffic before breaking. The wingman took a normal interval on his leader and broke. While in the break turn, the EA-6B crews heard the F-14 call "180 with gear" and shortly thereafter the S-3 made the same call. Rolling out downwind, however, the lead EA-6B crew observed only one aircraft ahead in the pattern, but assumed that the low visibility at the approach end of the runway precluded them from seeing the F-14 ahead of the S-3.

Approaching the 180, the lead EA-6B was cleared for a full stop landing and both crewmembers noted their interval on short final, plenty of room, even considering the long (14,000-foot) runway and the extended rollout distance. (Normally all aircraft roll to the 3,000-foot remaining turnoff for entry into the fleet line area.) The lead EA-6B executed a normal landing and rollout, but the pilot allowed the aircraft to decelerate without braking until approximately 5,000 feet remaining to allow his wingman ample room for his rollout. As the lead pilot got on the binders to bleed off the remaining 30 to 40 knots before the turnoff, he and his crew were startled by a call from the S-3 requesting a turnoff at 3,000 feet. A moment later, they observed the dark shadow of an unlit aircraft looming large in the windscreen. The pilot immediately brought the EA-6B to a screeching halt using maximum braking, stopping less than 100 feet behind the slowly moving S-3.

Once safely back in the readyroom, a review of what had transpired revealed the following: The S-3 had taken off from NAS West Coast following a parts run and was returning to NAS High Desert. The S-3 crew became aware that they had no external lights en route to destination. Upon contact with approach control, the crew reported their no-light situation and felt it was unnecessary to subsequently advise the tower. As a result, tower personnel mistook the F-14 for the S-3 when calling traffic for the EA-6B flight entering the break. Tower personnel were also unaware of the marginal weather in the vicinity of the runway. Had the pilot of the lead EA-6B not been compelled by weather conditions to correct for runway alignment, thus increasing his interval, this could easily have been a full-fledged mishap in the form of either a midair collision or collision on the runway.

Two prime lessons can be gleaned from this incident:

(1) If you lose your lights, make sure your controllers and everyone in your vicinity know about it.

(2) Stay in positive control for as long as possible; if a GCA is available, use it.

Remember, if you lose your lights, *you* may be VFR, but you're really *out of sight, out of mind.*

The reporting format of OPNAVINST 3750.6 makes it easy to report this type of incident. If we can get hazard information like this out quickly, we may be able to prevent a mishap!

Cdr. Billy Moore
Air Operations Analyst
Naval Safety Center

A Ride Down the Primrose Path

By Lcdr. Rick Carlson

THE whole trip had been for naught as it turned out — my attempted NATOPS check ride with the regional evaluator at NAS Pensacola was logged as a 0.8, 0.7 of which was actual. Blame it on bad forecasting. Our C-1 had come off the wash rack the day before and had just received an extra bath from the day's steady downpour. It was easily evident that our cabin/avionics compartment was the victim of a leaky overhead. The extent to which all this water would affect our electronics would only be demonstrated later.

It was a little over an hour flight back home but after a quick check with weather, the glum forecast caused me to have the fuel tanks topped off. A missed approach would necessitate a 200-mile leg to get anywhere better than basic alternate minimums. Besides, it was getting dark. So, after fueling and declaring a new alternate on the flight plan, we saddled up and launched into another fresh-water rinse.

Too bad we had been awaiting repairs on our VHF comm and NAV radios as well as both ADFs. But our working UHF and TACAN had been serving us well and, after all, NATRACOM routinely got along with no more than that.

So we trundled along relatively carefree until 30 miles south of home plate — that's when the TACAN went dead. Oh, well, it was going to be a GCA anyway since field weather was 500-1¼. No sweat. However, the concern quotient went higher by the time we got on base leg and realized no one was talking to us. The guard receiver soon proved its worth, though, as a loud voice pierced our headsets, telling us to acknowledge with IDENTs and to try a host of other frequencies (none of which proved helpful). Since we had overshot final approach course during this minor snafu, we were given a 180, followed shortly by a turn to final. At that point, only two minutes from home with weather above GCA minimums and good old guard working for us, it didn't seem necessary to play the "what if" game any further. Besides, the options were few and unpleasant: 1) fly east and hope for at least marginal VMC; or 2) fly the triangle and hope for a TRACOM jet to be sent up as a shepherd.

We never got to that missed approach step, fortunately. But it almost would have been better. Oh, Mr. Murphy invoked his famous law all right, but the C-1 had already lost enough of its systems for one night. This time, GCA's transmitter fizzled, cutting the controller off in mid-word, and leaving us at the two-mile mark to either find our own way home or climb out and think of something else. There would have been only one alternative at that point, had it not been for somebody popping flashbulbs off in a cloud up ahead and below us — hallelujah, the strobes! Not exactly total runway environment, but considering the alternatives, it seemed good enough. The flashing blob continued to draw

us down like a magnet — disorienting in its indistinctness and in its absence of directional indications. As we got closer though, the blob became a blurred line of lights and we finally had a centerline. But the combination of an expected 500-1¼ that was actually closer to 200-1½ and a higher wooded slope in front of the runway resulted in a dangerously low treetop reconnaissance of the airport boundary. Added to this was a natural instinct to home in on those strobes, the only portal out of the dark void, our quick ticket back to the real world. Needless to say, planting it with the strobes between the legs would not have provided the desired result. During those few tense seconds between lost comm and actually seeing the runway itself, it was those quick glances at the altimeter feeding a growing skepticism of our position that delayed our rendezvous with the ground. Finally, a dark outline of trees appeared as a horizon, quickly bringing everything into focus. With a sharp exclamation and addition of power, we were soon brushing over the runway's edge, instantly older and instantly wiser.

In retrospect, it had been an *extremis* situation, to be sure, but one that could have been made more comfortable through better consideration and planning. First, there should have been a preconception or foreknowledge of what the "runway environment" would look like upon breaking out. Sure, we've all seen it before, but not without some info from the radios or the instruments to back up the visual cues. The beginning of the sequenced flashers is usually 3,000 feet in front of the runway edge and 4,000 feet before the instrument touchdown zone. On a three-degree glide slope, a pilot should be looking at no less than 200 AGL on his altimeter as he crosses over the first light. Second, the minimum descent altitude could have been referenced along with the decision height prior to the approach. Past final approach fix, it provides the best reference altitude for staying out of the trees and, in fact, becomes a hard floor, should glide slope info be lost. Third, overanticipation of a ceiling reported as not-so-bad can easily lure someone lower than he had intended. Disparities between stated and actual conditions sometimes do occur, which is why a true pro will always be a little skeptical of what he hears. Fourth, for a multipiloted plane on an approach to minimums, the old technique of "pilot on the gauges, co-pilot outside" would have kept misperceptions to a minimum. In fact, a good co-pilot will keep his partner updated on outside progress, to include small heading changes as necessary, until that call, "runway in sight" can be made.

Our ride down the primrose path was an event that would stimulate just about any Monday-morning quarterback. The lessons are indeed valuable but far better that they be learned from a readyroom easy chair. ◄

What do these word lists have in common?

Using the words in the two right hand columns, circle the appropriate letters to spell each term. Words may be spelled forward, backward, diagonally or up and down. When you are finished, use the remaining letters to find the hidden *Message*.

W	S	C	I	L	U	A	R	D	Y	H
Q	H	C	O	R	R	O	S	I	O	N
A	U	E	Y	T	E	F	A	S	O	O
N	N	N	E	G	O	R	T	I	N	I
A	E	I	A	L	L	I	T	T	Y	T
L	G	D	A	S	T	A	E	M	R	A
Y	Y	N	I	D	C	I	S	F	M	R
S	X	U	F	I	R	R	R	U	H	B
T	O	O	L	S	A	D	D	E	A	I
N	D	B	C	Q	P	E	Q	L	S	L
F	U	N	C	T	I	O	N	A	L	A
P	K	C	E	H	C	T	O	P	S	C

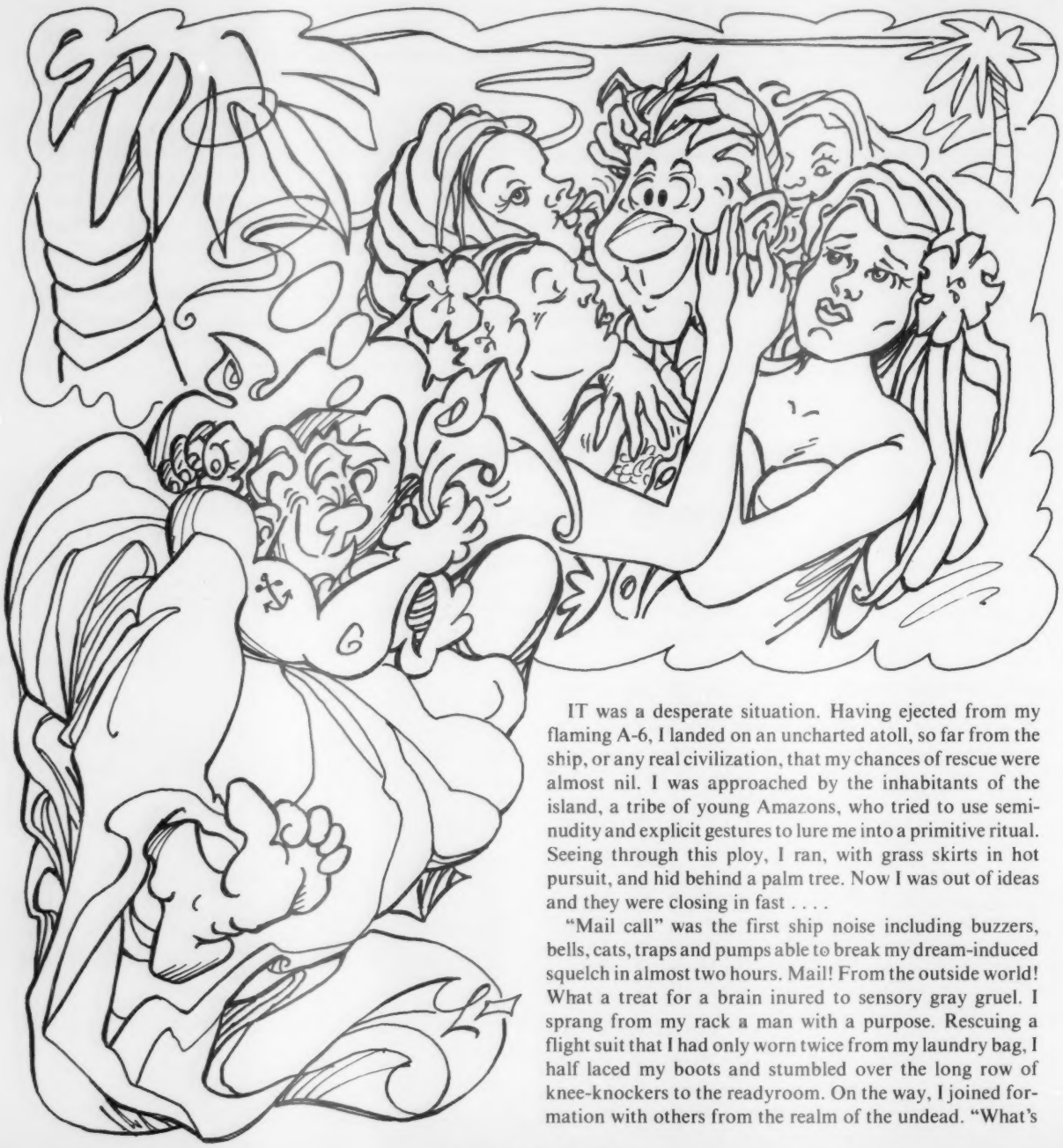
ANALYST
CALIBRATION
C.D.I
CORROSION
E.M.R.
F.O.D.
FUEL
FUNCTIONAL
H.M.R.
HYDRAULICS
N.D.I
NITROGEN
OXYGEN
PUBLICATION
Q.A.R.
Q.D.R.
SAFETY
SPOTCHECK
TOOLS
T.P.D.R.
WHEEL-TIRES

Courtesy: AT1 Steven J. Ludwig and AMS1 Thomas J. Eaton, VQ-4 Quality Assurance

Individual flight activity

or How IFARS saved me from a fate worse than death

By Lt. John Flynn
Approach Editor



IT was a desperate situation. Having ejected from my flaming A-6, I landed on an uncharted atoll, so far from the ship, or any real civilization, that my chances of rescue were almost nil. I was approached by the inhabitants of the island, a tribe of young Amazons, who tried to use semi-nudity and explicit gestures to lure me into a primitive ritual. Seeing through this ploy, I ran, with grass skirts in hot pursuit, and hid behind a palm tree. Now I was out of ideas and they were closing in fast . . . .

"Mail call" was the first ship noise including buzzers, bells, cats, traps and pumps able to break my dream-induced squelch in almost two hours. Mail! From the outside world! What a treat for a brain inured to sensory gray gruel. I sprang from my rack a man with a purpose. Rescuing a flight suit that I had only worn twice from my laundry bag, I half laced my boots and stumbled over the long row of knee-knockers to the readyroom. On the way, I joined formation with others from the realm of the undead. "What's

y reporting in the Navy

the scoop on the mail, A.J.?" I asked the SDO.

"No real mail, unfortunately, just some FLIP pubs, parts and IFARS. The Ops 'O' says you gotta do your IFARS right away, 'cause they're late already."

The mailboxes came into view. Outsized computer printouts stuck out uniformly from each one, a pale green paper platoon stood on its side. "IFARS! We rush down here for letters from home and all we get are these cretin computer printouts?"

"He says just sign 'em and turn 'em in. They've never right anyway."

"That's no lie," I said, "last year they gave me flight time in a plane I've never even seen before!"

Sound familiar? If not, you're lucky. The IFARS (Individual Flight Activity Reporting System) has been in existence since 1968, and it still has many of the same problems that have plagued it since the beginning, including inaccuracy, lost records and a perceived lack of usefulness. Simply put, it seems to many to be a big, inefficient paperwork mill that isn't giving the taxpayer much for his money. So why do we have it, and what can be done about it?

Prior to July 1, 1968, individual flight activity data was gathered by the Bureau of Personnel (BUPERS) for verifying flight time minimums and listing experience levels on officer data cards. The Safety Center had been routinely requesting this data from the Bureau for use in its statistical analyses, but the Safety Center also needed flight activity data the Bureau's data base could not provide. Since it had become apparent that the Safety Center had the greater need for the information, responsibility for the data base was shifted to the Center and IFARS was created.

Its stated purpose is to be the primary collection system for individual flight and simulator data in the Navy. The data flow, detailed in figure 1, works like this at the squad-

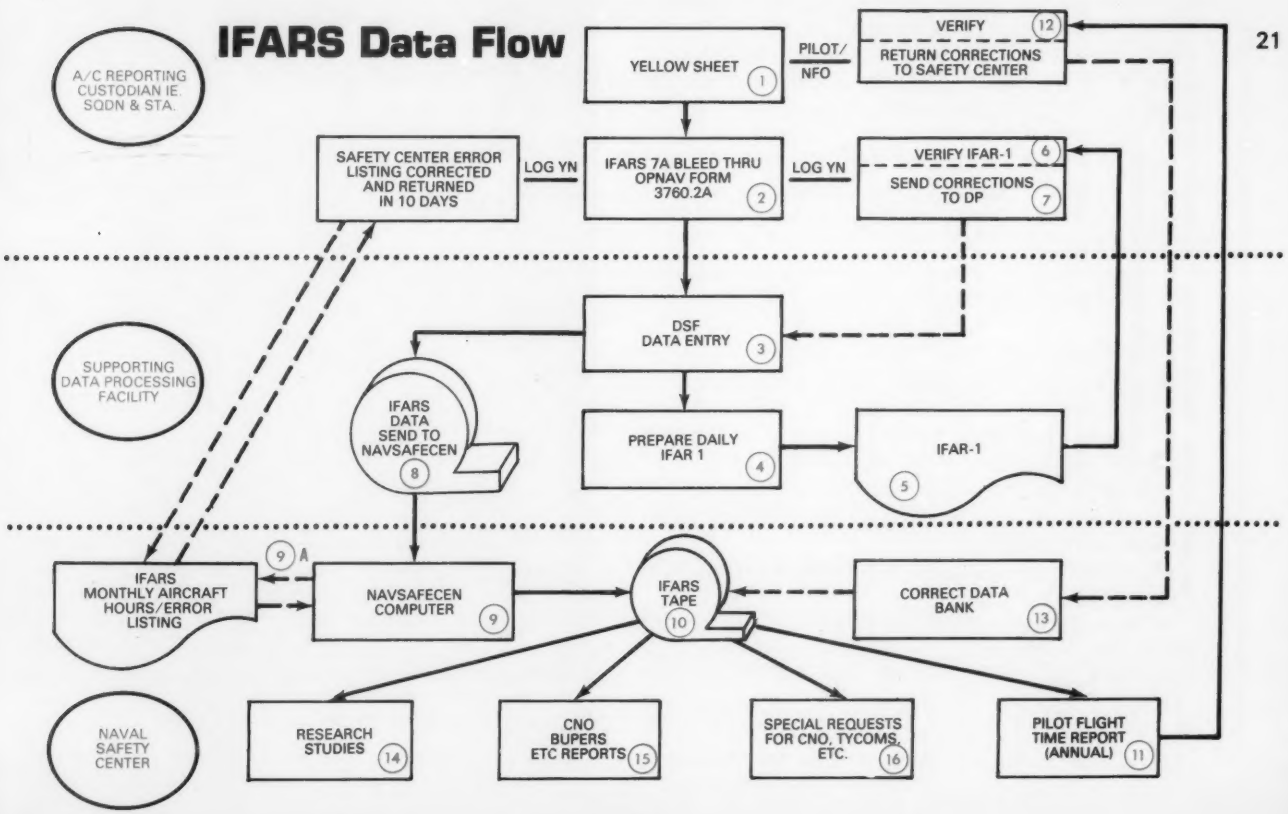
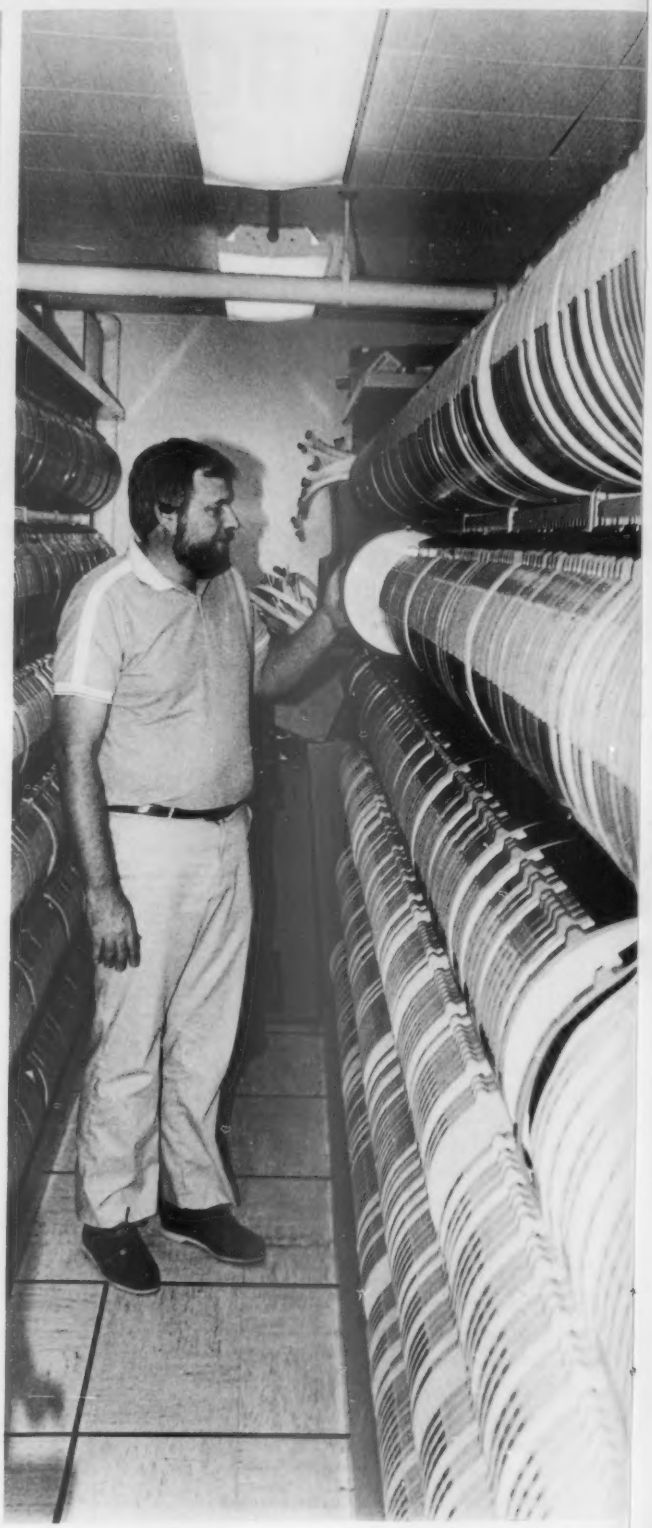

IFARS Data Flow
A/C REPORTING CUSTODIAN IE. SQDN & STA.
YELLOW SHEET 1
PILOT/ NFO
VERIFY 12
RETURN CORRECTIONS TO SAFETY CENTER
SAFETY CENTER ERROR LISTING CORRECTED AND RETURNED IN 10 DAYS
LOG YN
IFARS 7A BLEED THRU OPNAV FORM 3760.2A 2
LOG YN
VERIFY IFAR-1 6
SEND CORRECTIONS TO DP 7
DSF DATA ENTRY 3
SUPPORTING DATA PROCESSING FACILITY
IFARS DATA SEND TO NAVSAFECEN 8
PREPARE DAILY IFAR 1 4
IFAR-1 5
9 A
IFARS MONTHLY AIRCRAFT HOURS/ERROR LISTING
NAVSAFECEN COMPUTER 9
IFARS TAPE 10
CORRECT DATA BANK 13
NAVAL SAFETY CENTER
RESEARCH STUDIES 14
CNO BUPERS ETC REPORTS 15
SPECIAL REQUESTS FOR CNO, TYCOMS, ETC. 16
PILOT FLIGHT TIME REPORT (ANNUAL) 11

Figure 1



ron level: Pilots enter raw data into the system by filling out their yellow sheets after each flight. The carbon copy, or bleed through, "7A," marked "IFARS data" is sent along with all the others filled out that month to a data service facility (DSF). This may be a Navy regional data automation center (NARDAC) or a data processing center aboard ship. There the data is keypunched onto cards or magnetic tape and sent monthly to the Safety Center. The local processing facilities are supposed to send daily IFARS reports, called IFAR-1s to the squadrons for verification. These are readouts of all data submitted for a given day, flight by flight.

When the cards or magnetic tape arrive at the Safety Center, the data is entered into the Center's computer and finally stored on magnetic disks. It can then be accessed for a variety of uses, such as:

- Annual Flight Time Reports — sent yearly to all flight crew personnel listing flight hours and landings by type aircraft.
- All Years Flight Time Summary Reports — sent to flight crew personnel on request, listing career flight time and landings by type aircraft, by year.
- Flight by Flight Detail Reports — sent out on request to aid in the reconstruction of lost log books.
- IFARS Monthly Aircraft Hours/Error Listing Reports — a synopsis of squadron flight time and data errors detected by the computer.
- IFARS Detailer's Catalogues — sent to BUPERS for updating personnel data.
- Command Screening Board Reports — sent to BUPERS for the Command Screen Board and Promotion Selection Board.
- Special Reports — job requests for statistics used in special projects. These include, to name just a few:

— Aviation Safety vs Flight Experience, Mar '80 and Oct '81

Fill out yellow sheets correctly and legibly, making sure the carbon prints through to the IFARS copy. Some commands may find that training in proper procedures is needed.

—Carrier Landing Accidents and Flight Experience, Feb '81

— Mishaps and Fatigue, Jun '83

— High Risk Flight Regimes, Jan '84

In addition to the one-time requests, IFARS data is used dynamically by the Center in its ongoing aviation safety programs. One example is trending, a type of statistical analysis that can help spot hazards before they become mishaps. Another example is safety publications. Approach routinely uses IFARS data as background material for articles and graphs. The data base is also used by aircraft analysts, mishap investigators and aeromedical personnel whenever they need statistics for research. A little known use of IFARS that may interest aircrews is that the Government Accounting Office (GAO) uses the data in periodic audits to verify flight pay eligibility.

The weaknesses of the system lie in two areas: accuracy and utility.

The system is said to have a 10 percent short-term error rate, which is eventually corrected to two percent. That doesn't sound too bad, but the low figure is misleading. First of all, two percent comes out to 27,200 records a year! Secondly, that error rate is based only on IFARS reports actually received at the Safety Center. It does not account for records not submitted, or lost in route.

The most common errors are made in the identification field of the yellow sheet. The printing is often illegible, and personal data, such as the social security number, is often in error. According to H.W. Raines, head of the IFARS division at the Safety Center, "The real problem is that there is no onsite verification of the data."

Squadrons often don't check their 7A sheets for accuracy and legibility before they send them in. This allows errors to get into the system that are hard to detect and correct. The IFAR-1 reports are designed to eliminate these errors by having the squadrons verify the data after it has been keypunched. Unfortunately, squadrons seldom check their IFAR-1s.

Even more inaccuracy is caused by lost records. A data processing facility lost several month's worth of 7A forms recently and could not accurately reconstruct the data. This incident, which involved an estimated 23,000 records, was unique, and was caught by the system because of its magnitude. But smaller losses of IFARS records, lost in route or not submitted, can go undetected. Raines says, "I know records are being lost every month by the system. But they aren't included in the error rate because we have no way of knowing how many there are."

One verification system that does seem to be working is the Annual Flight Time Reports correction procedure. These reports contain individual flight data and are verified by the flier himself. It seems when the information is personal, it gets more attention. Raines says, "A few guys just sign them and send them in without even looking at them, but most seem to be conscientious about checking the reports against their logbooks. We catch a lot of errors that way." Raines feels that the IFARS data base is accurate enough for broad statistical analyses, but admits it could be a lot better.

The other major problem with IFARS is a lack of usefulness to the fleet. Right now, the system mostly provides management information to the higher levels for use in long range decision making. The few reports it does send back to the deckplates are done more to improve the accuracy of the data base than to provide service. A state of the art information system could do a lot more with the same data and be more accurate in the bargain.

For these and other reasons, the Marine Corps switched to the Flight Readiness Evaluation Data System (FREDS) starting in 1976. Developed by and allegedly named after Lt. Col. Fred Lacy, this system provides for on-site verification of data through microcomputer systems based at the airwing level. These computers contain a local data base which can verify aircrew names, personal data, aircraft bureau numbers, etc., and send back errors to the squadrons on a daily basis. FREDS dropped the Marine Corps error rate of 11 percent to 0.5 percent for first year. In addition, FREDS also takes care of MDCS* reports and is capable of providing other squadron management information, such as aircrew training and readiness levels for various mission areas.

The Navy is currently evaluating a new system that would satisfy the requirements of IFARS, FREDS and NALIS** from a single source document. Called NAVFLIRS (NAVal FLIght Record System), it could be introduced as early as October 1985, if it is funded. It would be a quantum leap forward to a state-of-the-art flight activity information system.

In the meantime, there are several ways that aircrews and their squadrons can improve the system we have:

- Fill out yellow sheets correctly and legibly, making sure that the carbon prints through to the IFARS copy. Some commands may find that training on proper procedures is needed.
- Verify yellow sheet data at the local level. Check name spellings, SSNs, bureau numbers, etc. Make sure the 7A copy is legible before detaching it and sending it in.
- Send IFARS data in on time. Late reports can compound errors in the system.
- Verify and correct data reported on IFAR-1s, IFAR Error Listings and Annual Reports.

IFARS has its problems, but it is helping to make naval aviation safer by providing a crucial part of the "big picture" to those who make decisions that affect all of us in naval air. We owe them our best shot at supporting the system. ◄

*Maintenance Data Collection System

**Navy Logistical Information System

Capt. J.R. Ruckriegel (left),
Capt. J.W. Piggott (right).

Capt. J.W. Piggott
Capt. J.R. Ruckriegel
VMFA-112

A single-engine approach in the Phantom means degraded lateral control, faster airspeed and limited waveoff capability. Compound this situation with a port engine fire, aft section fuel leak, power control one (PC-1) failure and no utility hydraulics, and the result is an F-4 crew with only one approach to pass its most important "NATOPS EXAM." Historically, the Phantom success rate in this extreme situation has not been high.

A routine VMFA-112 intercept flight from MCAS Yuma rapidly became a multiple emergency situation. While taking separation from the first successful stern attack of a three-plane intercept mission, the port fire warning light illuminated. Capt. Piggott retarded the throttle to IDLE and reported no secondary indications. The fire-warning light remained on, and the port engine throttle and master switch were secured. Piggott transmitted his situation to a wingman and turned toward home base. Approximately two minutes after the initial fire-warning light, the flap indicators barberpoled and the wheels light began to flash. This situation was relayed to the RIO, Capt. Ruckriegel, who was already reading the engine fire and single-engine landing checklist. The centerline fuel tank was jettisoned to reduce gross weight. The fuel gauge started to spin continuously; numerous warning lights illuminated, and the flap indicator cycled between one-half and barberpole. Utility pressure went to zero, and the PC-1 began to bleed off. Upon completion of the utility failure checklist, the PC-1 was zero and a new checklist was reviewed.

The wingman rendezvoused and reported streaming fuel but no

BRAVO ZULU

visible fire. The fire-warning light remained illuminated. The crew elected to make a long field arrested landing based on the high touchdown speed associated with a PC-1 and utility hydraulic failure. Piggott reviewed the appropriate checklist with Ruckriegel and decelerated to 250 knots. He extended the landing gear pneumatically and performed a controllability check.

Piggott flew a 230-knot no-flap, flat approach and touched down approximately 500 feet beyond the short field gear. On short final, lateral control was significantly degraded to the point that the pilot had full right aileron and as much manual rudder as he could physically input. Piggott deployed the drag chute and aerodynamically braked the aircraft to a successful arrestment.

Piggott and Ruckriegel are commended for the expert manner in which this multiple and challenging situation was successfully handled.

1stLt. Monte E. Dunard (left);
Cpl. Carlos A. Fernandez (center),
Capt. Herbert L. Heyl (right).

Capt. Herbert L. Heyl
1stLt. Monte E. Dunard
Cpl. Carlos A. Fernandez
HMM-164

THE functional checkflight started out routinely as the aircrew of the CH-46E proceeded through the test checklist. While in flight the HAC, Capt. Herb Heyl, noticed engine fluctuations in the No. 1 engine and decided to abort the checkflight. The copilot, 1stLt. Monte Dunard, who was the pilot at the controls, was instructed by the HAC to return to base.

During the aircraft's turn, the HAC noticed additional engine fluctuations. Suspecting an engine condition actuator malfunction, the HAC assumed control and slowed the aircraft to the single-engine airspeed envelope. The crew chief, Cpl. Carlos Fernandez, smelling fumes, confirmed that the No. 1 engine was billowing smoke. Simultaneously, the No. 1 power turbine RPM dropped to zero, and a loud explosion was heard with an accompanying engine fire-warning light. The HAC opted for an immediate landing at an unprepared confined area landing zone. While the crew was busy making emergency radio calls to clear the landing zone of aircraft, reacting to an engine fire and preparing for landing, the cockpit was instantly filled with smoke and fumes. Smoke elimination procedures were initiated and the cockpit cleared on final. A single-engine no-hover landing was accomplished without incident. Postmishap investigation revealed that a faulty engine oil check valve caused engine oil starvation leading to the eventual destruction of the No. 1 engine.

The timely and professional manner in which the aircrew handled these emergencies is exemplary. The aircrew responded in a professional manner and avoided possible destruction of an aircraft and loss of lives. ◄

Dead Man's Land

By Lt. Franz Federschmidt
VP-11

JUST another routine flight ahead for the intrepid crew of the ever-dependable, all-weather P-3C Orion. Point-of-departure is NAS Cold, Rainy and Windy. The runway is 10,000 feet long, it is 33 degrees Fahrenheit, rain is falling steadily, an RCR of 10 is reported, and our Orion weighs in at 130,000 pounds. Per SOP at NAS Cold, Rainy and Windy, we will be taking off with a 5- to 10-knot tailwind to make our climbout over the water vice over the mountains which surround the field on three sides. No big deal, we all have "The Right Stuff" — a 10-knot tailwind is no sweat, right? The flight engineer has computed all the required takeoff performance data as per *NATOPS* and everything is looking good. Preflight is completed and our Orion checks out 4.0.

The crew is briefed before start checklist is completed and engine starts go smoothly. After start checklist is completed (same old stuff), we're cleared to taxi. We copy our clearance, complete anti-ice and deice checks, and takeoff checklist while taxiing. Tower reports winds to be 5 to 10 knots from directly behind us and clears us for takeoff. Here we go, on the roll. Gee, it sure seems as though it took a long way to get 80 KIAS, but power checks good and we continue on. It seems as though we have rolled quite a distance by the time we get to rotate at 127 KIAS, but now we are airborne and safely on our way again.

A seemingly innocent scenario to be sure, but this crew was in an extremis situation. The doppler showed ground speed to be 162 knots when rotate was finally reached at 127 knots *indicated air speed.* You guessed it — although tower **was calling a 5- to 10-knot tailwind, we encountered a 35-knot tailwind. Besides being dangerously close to exceeding** the ground speed limit of *174 knots* for our tires (no, you won't find this limit in NATOPS, but take a look on the sidewall of your tires — it's printed there), how will this revelation affect all of Flight Engineer Plug A. chart's takeoff performance computations? Check out the table below for a side-by-side comparison.

PREDICTED TAILWIND	ACTUAL TAILWIND ENCOUNTERED
OF 10 KNOTS	OF 35 KNOTS
DISTANCE TO ROTATE = 4080 FT	DISTANCE TO ROTATE = 5780 FT
REFUSAL = 128 KIAS	REFUSAL = 90 KIAS
ROTATE = 127 KIAS	ROTATE = 127 KIAS
OK FOR TAKEOFF	IN THIS CASE:
	VD = Vmc GROUND (102 KIAS)
	VR (90 KIAS) VD (102 KIAS)
	THEREFORE:
	"NO MAN'S LAND" FROM 90 KIAS TO 102 KIAS (UNABLE TO TAKE OFF-UNABLE TO ABORT), OVERWEIGHT FOR TAKEOFF WITH THE GIVEN CONDITIONS

All chart computations were made for the conditions previously stated; i.e., GW 130,000 OAT 33 degrees Fahrenheit, RCR 10, 10,000-foot runway.

We can see from the side-by-side comparison that we were in "No Man's Land" (Dead Man's Land) from VR (90 KIAS) to VD (102 KIAS) and would not have been able to successfully abort or go flying. One piece of faulty information, winds as called by the tower, put this P-3C in a dangerous situation. The stage was set for a tragedy. What lessons can be gleaned from this experience?

(1) Before starting the takeoff roll, especially when operating in adverse weather, *know* your projected distance to rotate, and be aware of your critical field length.

(2) Consider the amount of runway required to successfully bring the aircraft to a stop.

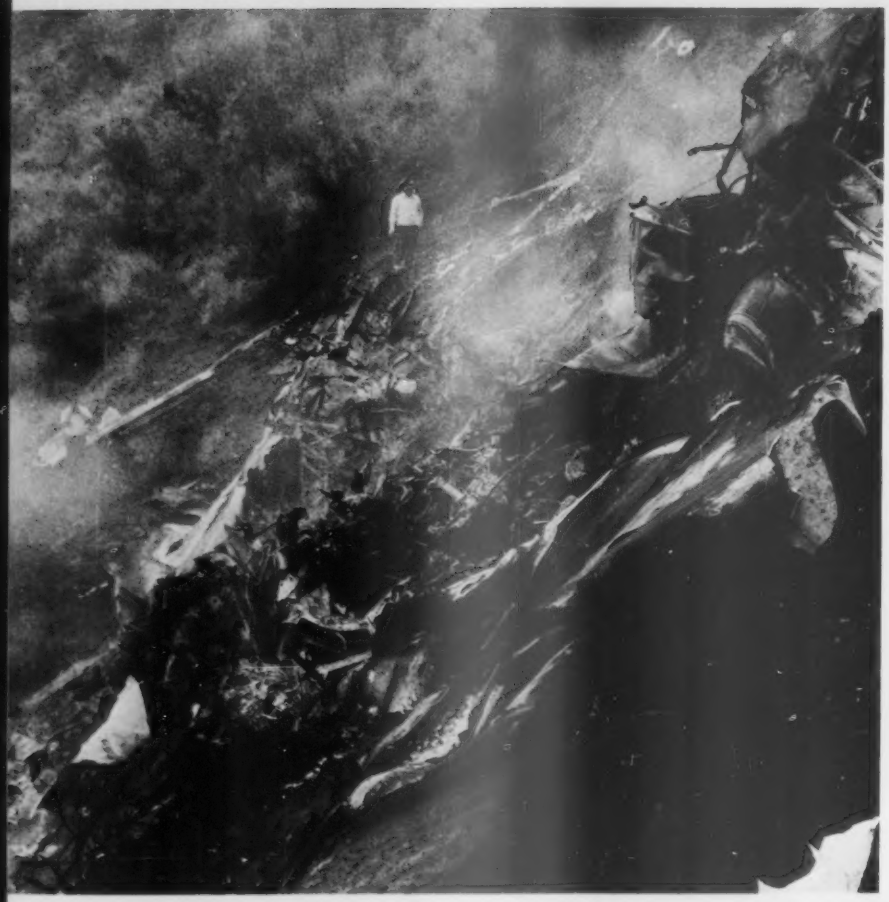
(3) Think about what you are going to do if you find yourself eating up more runway than you expected.

(4) The pilot *must* make the final decision whether to abort or go flying even if a malfunction occurs prior to VR. To make the correct decision, all of the pertinent information must be considered (the time to think things over is prior to the takeoff roll — not while you are rolling down the runway).

There may be a few of you out there grumbling over lesson No. 4. You are thinking that NATOPS says, "If at any time prior to refusal or rotation speed (whichever comes first), the pilot, copilot or flight engineer have any indication of a malfunction affecting flight safety, they shall make this fact known and the pilot shall reject the takeoff and announce abort." If, however, the data used to figure takeoff performance was faulty in some way, your computed refusal speed may put you far past the point at which you could successfully abort. In our scenario, for example, preflight computations led us to believe that VR was greater than VRO and we could therefore safely abort at any time up until VRO (127 kias). Our data (winds in particular) used was faulty, however. Using the actual winds (35-knot tailwind) to make our **computations, we see that VR was actually 90 KIAS. In our scenario what would have happened if an abort had been initiated at 125 KIAS (2 knots below our faulty computed VRO)? Scratch one P-3C and aircrew — that's what. Or, what if an outboard engine failed at 92 KIAS? That is why the final decision to abort or to go flying must be left with the** pilot. Just to make things a little more interesting, consider that the flight idle stop on No. 4 malfunctioned (it actually did on the following landing) and your hand slipped right over No. 4's power lever as you went to move the power levers into reverse during the abort. Remember, NATOPS is not a substitute for good judgment. EXPECT THE UNEXPECTED! ◄

Mishap Investigation Tips from the Safety Center

(First of a NAVSAFECEN series on Mishap Investigation Tips)



Do's and Don'ts. These tips can be used as a guide and are not intended to be all inclusive. Some of the "DO's" in mishap investigation are:

— Review and update your pre-mishap plan periodically.

— Know what services are available: law enforcement, military, Civil Air Patrol, National Transportation Safety Board, etc.

— Know the coroner's position and his authority concerning deceased crewmembers.

— Have clean containers available for aircraft fluid samples.

— Keep an open mind throughout the investigation.

— Use the talents of technical representatives in the field, as needed.

— Keep all unauthorized personnel from the crash scene.

— Take extensive pictures.

— Interview witnesses early before they have an opportunity to discuss what they have seen with others. Let them do the talking, then ask questions.

— De-arm all ordnance prior to working at the crash site. If terrain conditions are such that wreckage recovery must be commenced to gain access to explosive devices or pressure containers, instruct personnel in the hazards involved and take precautions to minimize these hazards.

— Have personnel available at the crash site to identify parts.

— Ensure a member of the AMB is present during all wreckage recovery operations.

— Forward applicable engine logs and accessory record cards with material being shipped for engineering investigation (EI).

— Make sure that material being shipped for EI is properly marked in accordance with existing instructions.

— Debrief at the conclusion of each work day to plan the next day's activities.

Some of the "DON'TS" in mishap investigation are:

— **Don't** wait until the crash alarm sounds to determine if your pre-mishap plan is workable and effective; have some practice "dry runs" with your mishap board members.

— **Don't** start your wreckage recovery on land prior to completing your on-scene investigation, unless removal is necessitated by operational or community relations reasons.

— **Don't** move the position of control surfaces, actuators, switches, etc., at the crash site.

— **Don't** underestimate the role of the flight surgeon.

— **Don't** disassemble suspect components in the field and then expect positive findings through an engineering investigation.

— **Don't** give up.

In any investigation, perseverance and an "open mind" are two all-important assets. They should be part of any list you may have to aid you in the conduct of your investigation.

Engine Failure. An important part of your investigation of an aircraft mishap is to determine whether the engine was capable of maintaining thrust at the time of the crash. A correct conclusion will help in answering the very important question, "Was engine failure the cause of the mishap?" The estimate of engine rpm in jet engines is based on indications of the energy expended in the stoppage of the rotor assembly and certain clues that indicate the engine operating temperature. Your analysis of the damage should take into consideration the angle of impact, location and degree of impact distortion, effects of distortion on the rotor assembly, and variations in rotational damage.

When considering angle of impact, we find that at a very low angle of impact there should not be much distortion of the engine casings and only slight interference with the rotor assembly. Although the engine may have been operating at a high rpm, there may be only slight rotational damage. As the angle of impact becomes more vertical, there will be more distortion of the engine. It will be found that the higher the impact angle, the more interference there will be between the rotor assembly and other engine parts.

Another variable in impact damage which affects the rotational damage is the location of the engine distortion. A slight distortion at the front of the compressor may cause severe rotor interference because of the number of blades involved and the log jamming that can result. If the same amount of distortion occurred in the exhaust cone, there might only be slight interference with the turbine rotor and little rotational damage could be expected. Indications of **high engine rpm** at impact will normally include some of the following:

1. Extensive damage to the compressor and/or turbine rotor blades with all blades severely bent or broken off in a direction opposite rotation.

2. Compressor rotor and stator blade interference.

3. High speed rubbing of the turbine disc, blades, shroud ring or exhaust cone. These high speed rubs may be identified by their concentricity and discoloration of the metal from frictional heat. The marks will be dark blue or purple.

4. A torsionally sheared turbine shaft. This shows sudden stoppage of either the compressor or turbine rotor and indicates an impact angle greater than 45 degrees with the engine operating in excess of 75 percent rpm.

5. Considerable ingestion of foreign material extending far back into the engine. If the material were charred or burnt, it would indicate that the engine had operating temperature at time of impact.

Indications of **low engine rpm** at impact will generally include some of the following:

1. Compressor and/or turbine rotor blades will not be uniform in bending. Some of the blades may be bent in the direction of rotation while others will be bent in the opposite direction. Some may exhibit a "Z" effect from compression buckling.

2. The damage will not be uniform.

3. There will be little or no evidence of compressor rotor or stator rubs. Those that do occur will be rough and may show "chatter" marks.

4. The shaft between the compressor and turbine rotors will probably be bent rather than sheared.

5. There will be little evidence of foreign matter ingestion in the combustion chamber and beyond.

The investigator should be alert for other indications of engine operating temperatures. When a compressor is damaged, blade particles and scrapings from the compressor case pass through the combustion and turbine section. If the particles are of nonferrous material and the engine is operating at idle rpm or above, there will be enough heat to melt the material and cause it to fuse with turbine and exhaust components. The location, pattern and degree of fusion on the hot parts is indicative of engine operating temperature and can give clues to the nature of this failure and sequence of events. If the engine is operating at normal temperature when compressor failure occurs, the fusion will be even and smooth appearing. The metal cannot be flaked off with a knife. If, however, the metal deposits are rough and globular, and can be scraped off, this adhesion would have taken place when the normally hot components were cool, i.e., flameout.

When looking for rpm indications, remember that with small angles of impact the engine may give evidence of either high, low or no rpm. This can be caused by the absence of case deformation and/or the fact that the indications were made at different times during engine breakup. Don't take any ONE indication. Look over the entire engine. The highest rpm indication should be considered as the impact or failure rpm.

LETTERS

Re: Who's Minding the Store Syndrome Breeds Midair Collisions (April '84)

Editor's note: Dr. Alkov's article got more comments from the Safety Center's aircraft analysts than any one we've published in a long time. We thought it would be enlightening to share them with our readers.

Norfolk, Va. — The "shutup I'll fly" syndrome is far, far the exception. I do not feel the scenario of the article is anywhere near as routine as indicated. In fact, the situations depicted are by far the exception.

Cdr. J.W. Maroon
Head, Fighter/Attack Branch

Norfolk, Va. — Lack of communication in the cockpit is certainly a scenario inviting disaster, and the "lone wolf" syndrome may exacerbate the situation, but how common is this occurrence? Early in the tactical, multicrew aircraft history, the "macho" pilot (saddled with a 200-pound partner instead of an extra 200 pounds of fuel) was probably much more in evidence than he is today.

In my experience with the A-6 community, I have found this attitude to be the rare exception. In fact, some of the strongest proponents of what we call "crew concept" have been pilots, *senior* pilots. The idea of the NFO being a full and equal partner in the aircraft is believed (rightly or wrongly) to have originated with the A-6, and our community is proud of that tradition.

In those rare instances where I have observed the pilot manning his aircraft whistling "macho man," it was usually a junior pilot still searching for his image. It should also be noted that this is not a one-way street; I have also observed (again, rarely) NFOs intimidate pilots, particularly junior pilots ("you just fly the aircraft, go where I tell you, and I'll handle the mission").

I believe one of the reasons for the demise of the "lone wolf" (along with maturity) is our current aircraft whose systems demand crew integration. Witness the difference in workload and mission contribution between the F-4 RIO and the F-14 RIO, or this increase in mission information available (through the NFO) from the A-6A to the A-6E TRAM.

For an individual to pursue the "lone wolf" syndrome in our current aircraft inventory is to seriously degrade the capability of machine and crew in both combat capabilities and safety. Most flight crews are smart enough to know that. A highly skilled crew working smoothly together, combining their independent talents and training in the extremely demanding TACAIR environment, is a thing of true beauty.

Lcdr. Ron Ayres
A-6 Analyst

Norfolk, Va. — The "F-8 syndrome" is a thing of the past. Crewed aircraft (F-4, F-14, A-6) are manned by pilots and NFOs that are trained and believe in the "crew concept." They work together as a team to accomplish their mission with greater effectiveness and efficiency.

F-4, F-14 and A-6 pilots have more time to spend outside the cockpit because NFOs accomplish many "inside" jobs. The second set of eyeballs is an invaluable asset while on the airways as well as in the tactical arena. The pilot does not decrease his lookout because he has an NFO, but rather he spends more time in his assigned lookout sector.

I do agree with increased midair potential during positive control and during high operational tempo. Positive control apparently gives the aircrew a false sense of security concerning midair potential. During high operational tempo, aircrew members seem to forget that having a midair would greatly reduce their chance of mission accomplishment.

Maj. L.D. Cohen, USMC
F-4 Analyst

Norfolk, Va. — The picture painted by this article is more bleak than reality. It alleges animosity between fighter crewmembers because the pilot didn't get a single-seat aircraft. My experience has been that most pilots would give the left or right portion of their male anatomy to get an F-14.

While to a certain degree the problem may exist, it is not of the magnitude suggested. One reason for the tendency is the great differences in flight time and responsibility that the pilot and NFO are exposed to. The NFO generally has over 100 hours less flight time than the pilot and has not had nearly the responsibility thrust on him as the pilot; i.e., the pilot has been taught to survive (solo flying) whereas the NFO has not been faced with this pressure.

The tendency today is to pair experience with inexperience in order to distribute talent and train more effectively. I don't feel that the attitude of "I'll fly the plane, you shut up and do your job" is valid today, particularly in the F-14. The plane cannot be flown effectively without crew coordination and defined crew responsibility. This is taught in the RAG and carries over into the squadron. If the pilot ignores inputs in the F-14 community, he will fail!

Basically I think the ideas expressed in the article are correct, but I think that the first part of the article expresses some generalities that are not valid today.

Cdr. J.D. Reid
F-14 Analyst

Re: "The HAC Didn't Hack It" (Feb '84 Approach)

FPO New York — I take exception to your conclusion that the mishap concerning the malfunctioning fuel system was caused by a "let's push on" attitude of the HAC. No! I was not the HAC on the ill-fated flight. You have reached the epitome of "Monday-morning quarterbacking." Haven't we all learned by now that mishaps are caused by a chain of events or set of conditions that act synergistically (in a negative sense) to produce the unwanted occurrence?

The maintenance aspects were concerned in some detail plus the fact that the fuel probe in the center tank was broken. The statement was made that " . . . it wasn't the fuel system malfunctions or a lack of effective squadron maintenance procedures that caused this mishap." However, the article also states that ". . . system was not calibrated in accordance with NAVAIR 01-230-HLH-2-2-1," and ". . . the TF-20-1 test set was not used to troubleshoot the system." The broken fuel probe was found *after* the mishap.

What about the possibility of a design deficiency in the fuel quantity measuring system that allows a false quantity to register when the probe is broken off and lying on or near the bottom of the tank?

What about NATOPS? Admittedly, a nonstandard fuel management setup exacerbated the problem. Had a normal crossfeed configuration (from the aft tank) been utilized, the mishap probably would not have taken place. Given the fuel quantities as shown in the photograph, the pilot could be faulted for not having at least one fuel boost pump on in the forward tank. Selecting or not selecting a switch position does not identify a "let's push on" attitude, but a relative lack of system knowledge. Question: Where are the possible failure modes of the SH-3 fuel system discussed and procedures for those failures presented? To my knowledge, NOWHERE!

I suggest that the "Monday-morning quarterbacking" be left to AMBs and Grandpaw Pettibone. Mr. Forbush, if you want to do something really constructive, present an SH-3 fuel system failure analysis, citing the subject mishap as a reason for doing so. The interests of the Navy and the precepts of Approach Magazine would surely be better served.

Cdr. R.W. Sidney, USN
USS *Nassau* (LHA-4)

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1984 Approach reader survey

In order to make Approach the most interesting and useful aviation safety magazine possible, we ask that you fill out this survey, fold and mail it as soon as possible. Please be completely candid in your answers and comments. All survey forms should be returned by 31 July 1984.

- Your Rank/Rate/Grade:
  - a. O-10/O-7
  - b. O-6/O-5
  - c. O-4/O-1
  - d. W-4/W-1
  - e. E-9/E-7
  - f. E-6/E-5
  - g. E-4/E-1
  - h. GS-
  - i. WG-
  - j. Nongov't (specify)
- What is your designation or job?
  - a. Pilot/NFO
  - b. Aircrewman
  - c. Aviation maintenance
  - d. Flight surgeon/physiologist
  - e. Air controller
  - f. Survival/Life support equipment
  - g. Other (specify)
- Has an Approach story ever saved you from harm or helped you prevent an aircraft mishap? ☐ Yes ☐ No Please elaborate:

  _____

  _____

  _____
- Please name or describe what you consider to have been the best Approach story to appear during the last year:

  _____

  _____

  _____
- Do you think the magazine's appearance has improved recently? ☐ Yes ☐ No If so, how?

  _____

  _____

  _____
- Rank the following types of stories in order of your preference (1-like best, 5-like least):
  - a. ____ Personal narratives ("There I was at 30,000 feet with my wings icing up . . .")
  - b. ____ Aeromedical and flight physiology stories
  - c. ____ Technical/hardware developments in aviation safety
  - d. ____ Philosophy/management ideas in regard to aviation safety
  - e. ____ Mishap and incident writeups
- Does Approach shy away from any important aviation safety issues? If so, what are they?

  _____

  _____

  _____
- If you could change one thing about Approach, what would it be?

  _____

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  _____

Other Comments.

FOLD

DEPARTMENT OF THE NAVY

POSTAGE AND FEES PAID
DEPARTMENT OF THE NAVY
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FOLD AND STAPLE

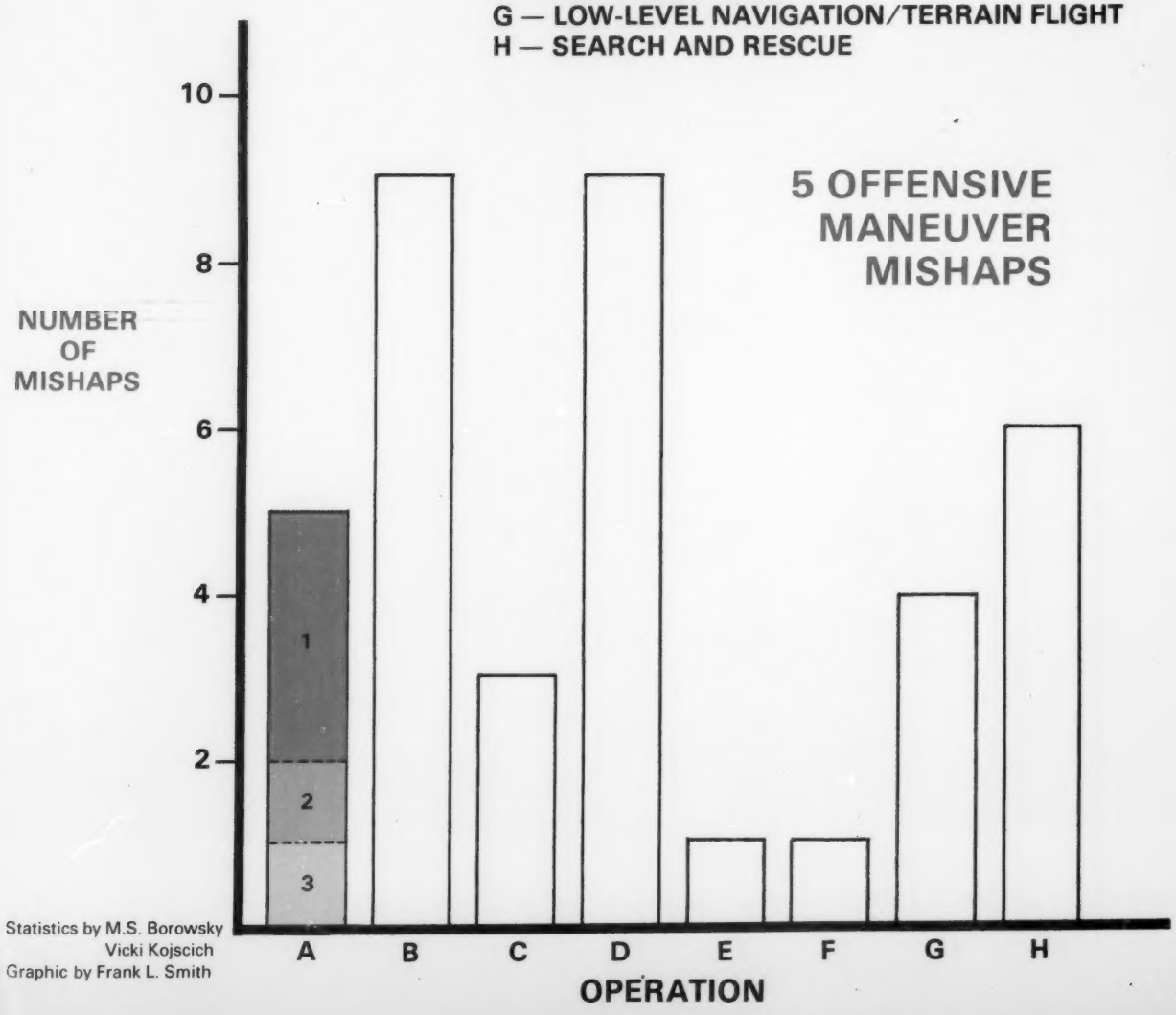
HELICOPTER

ALL NAVY and MARINE
HIGH RISK FLIGHT REGIMES
CLASS A MISHAPS/PILOT CAUSAL FACTOR
CALENDAR YEARS 1977 — 82

OPERATION

A — OFFENSIVE MANEUVERS
1. ASW TACTICS — 3/0
2. LOW LEVEL TARGET RUN IN — 1/1
3. OTHER — 1/0

B — CARRIER LANDING
C — FORMATION
D — CROSS COUNTRY
E — CARRIER QUALS
F — AIRSHOWS/DEMOS
G — LOW-LEVEL NAVIGATION/TERRAIN FLIGHT
H — SEARCH AND RESCUE



Statistics by M.S. Borowsky
Vicki Kojscich
Graphic by Frank L. Smith

FRIDAY PM — ARRIVAL
O'CLUB BAR
Happy Hour
SATURDAY AM 0300
SATURDAY AM 0600
OH-H-H!
THE AOM, NATOPS QUIZ, AIRCREW TRAINING
ODO
THE BRIEF
REMEMBER SOUTH TARGET IS CLOSED - DO NOT USE!
NEW RUN-IN HDG 180°
NEW FREQ 279.6
QUESTIONS!! WE'RE LATE... LET'S WALK!
PREFLIGHT
CLEARANCE
Amendment to your clearance... climb to maintain ... turn as ... to a heading of ... via ... CRACK ... Then ... COPY?
ROGER COPY.
TARGET IN SIGHT - LET'S COME RIGHT!
THE MISSION
TALLY TWO'S IN HOT!
NOTE: SOUTH TARGET
RTB
AM I CLEAN?
UH... YEP!
NOTE: 1 MK 76
THE BREAK
GUESS WHAT?
THE POSTFLIGHT
IT'S UP AND UP, GUNNY-
THE DEBRIEF
CHEATED DEATH AGAIN...
YOU GOT ANYTHING?
NAH, DO YOU?
NAH, ENJOYED IT GANG - SEE YOU AT THE BAR.
SATURDAY PM
O'CLUB BAR
Ladies Night
DO YOU SEE YOURSELF OR YOUR SQUADRON DEPICTED? IF SO,
TIME FOR CHANGE!
By CAPT. L. WISMER ASO MAG 41 DET A VMFA 321